A CHILTON PUBLICATION

the Iron Age

E NATIONAL METALWORKING WEEKLY

April 1, 1954

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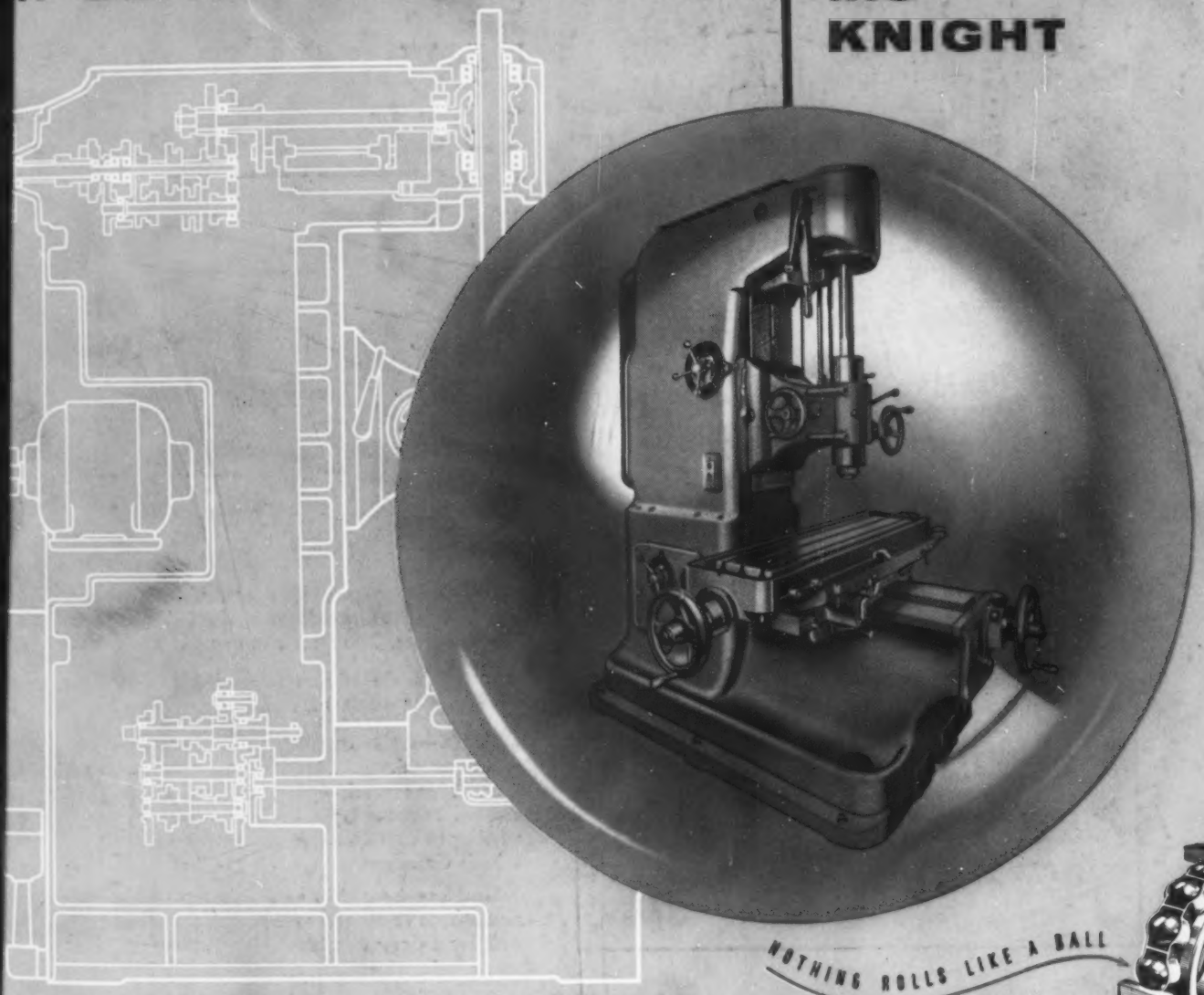
W DEPARTURES AT WORK

all through the KNIGHT



NOTHING ROLLS LIKE A BALL

Combining great capacity with exceptional accuracy, W. B. Knight's No. 50 is a versatile milling and boring machine. New Departure **ball** bearing applications are found literally throughout the Knight. They assure rigid support of moving parts . . . maintain accurate pitch-line contact of gears . . . give longer life with minimum maintenance.

New Departure **ball** bearings offer operating advantages to *your* product. Call in your New Departure engineer . . . find how **ball** bearings make a good product even better.

NEW DEPARTURE
BALL BEARINGS

NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT
Plants also in Meriden, Connecticut, and Sandusky, Ohio
In Canada: McKinnon Industries, Ltd., St. Catharines, Ontario

NEW

40,000 RPM ROTOR PENCIL GRINDER pays for itself in 3½ weeks

PENCIL GRINDER FACTS

WEIGHT	13 ounces
LENGTH	5¾″
DIAMETER	1″
FREE SPEED	40,000 RPM
COLLET	⅛″ or ¼″

For dies, patterns and 1001 grinding jobs.

JOB—High pressure ½″ diam. tubing for condensers—grind welds smooth. Used heavier die grinders. Took 15 minutes per weld.

SOLUTION—Tried new Rotor Pencil Grinder. Operates at 40,000 RPM.

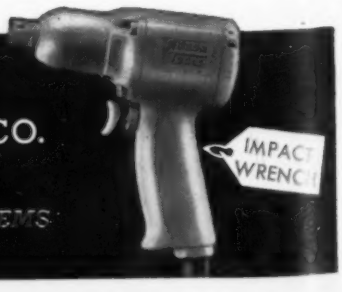
RESULTS—Grinding time cut 7 minutes per weld, or 46.5%. This "pay-off" amounts to $22.32 per week—pays for grinder in 3½ weeks. Mounted points last twice as long, adding to savings. Customer bought 8 Rotor Pencil Grinders.

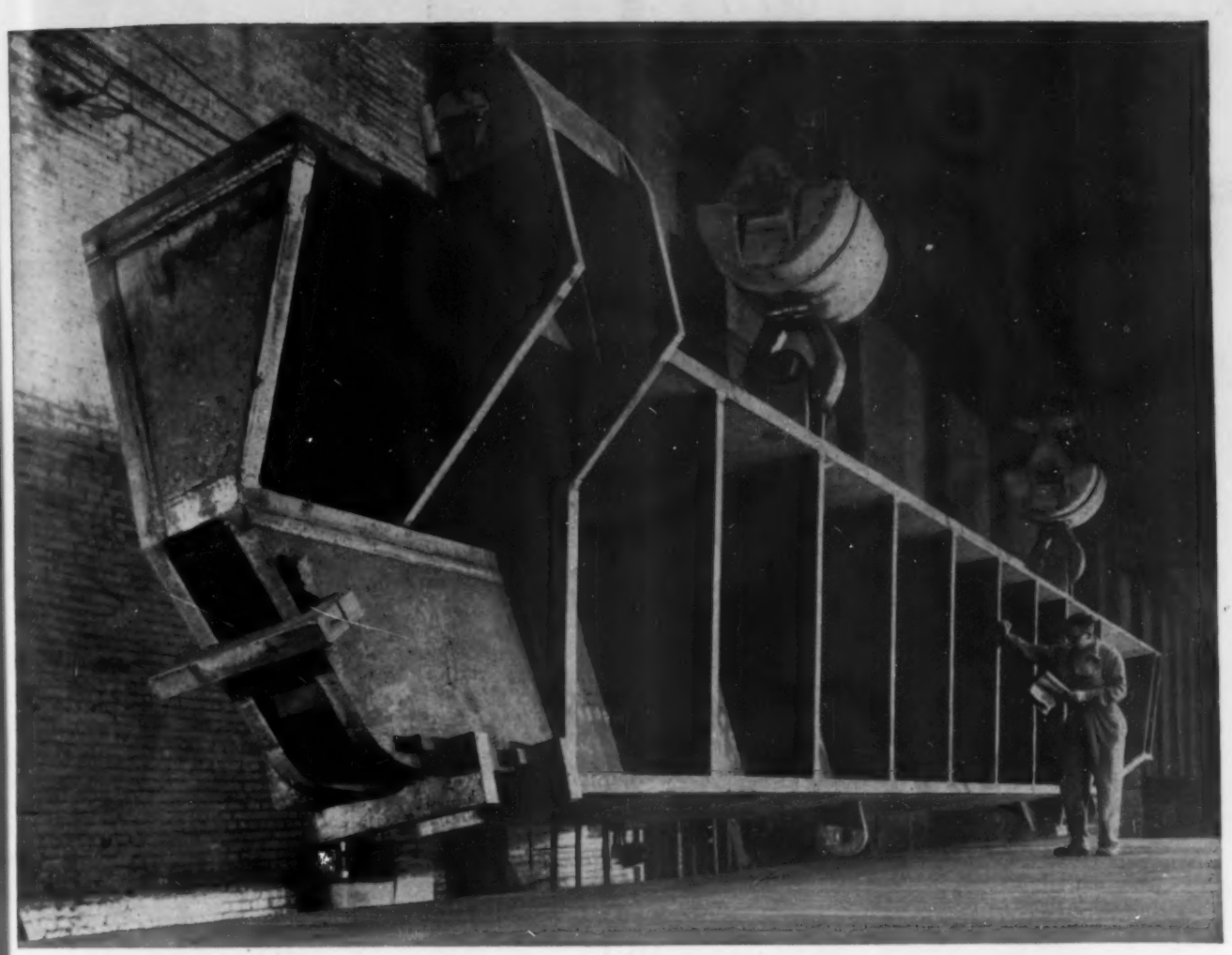
Find out how this new grinder and other new Rotor Tools can save *you* time and money! Ask for a demonstration.

THE ROTOR TOOL CO.

CLEVELAND, OHIO

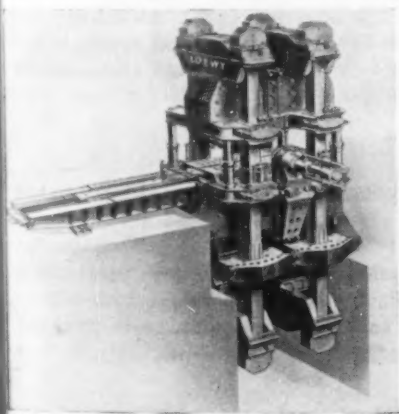
UNBIASED ANALYSIS OF PORTABLE TOOL PROBLEMS





HUGE WELDMENT for 35,000-ton FORGING PRESS

Of tremendous importance to America's air might are the powerful die-forging presses now being constructed for the U. S. Air Force. One of these is the 35,000-ton-capacity press, designed by Loewy-Hydropress, Inc., nearly double the capacity of the largest forging press now in service in this country.



Visualization of finished press, showing the 60-ft sliding table. The die bed will ride along the table in 30½-ft strokes. Design and construction by Loewy-Hydropress, Inc.

Rapid Production of Aircraft Parts

With a single gargantuan stroke, this giant press will form wing panels or main beams that formerly required many hours of tedious machining. The forged parts will be considerably stronger than if "hogged out" of solid blocks of metal.

The entire die-bed area and the metal being forged will ride on a slide table supported by two massive Bethlehem weldments. Each weighs 125,662 pounds and measures 60 ft by 6 ft by 4 ft, 8 in. They were fabricated from heavy rolled plates, up to 3 in. thick, in our Weldment Shop.

Weldments are Versatile, Economical

If you are in need of a machine part or finished assembly, simple or complex, small or large, we suggest you look into the possibility of using a Bethlehem Weldment. We can often save money for you by trimming off excess weight, without loss of strength or rigidity. What's more, we work directly from your blueprints, incorporating forgings, castings or structural shapes into the finished weldment, if desired. A letter or phone call to the nearest Bethlehem sales office will bring you further information.

BETHLEHEM STEEL COMPANY
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM WELDMENTS

BETHLEHEM STEEL

The Iron Age

Vol. 173, No. 13, April 1, 1954

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NEWS DEVELOPMENTS

STEEL INDUSTRY WAGE GRAVY TRAIN SLOWS—P. 67
Odds favor a peaceful settlement of steel wage contract negotiations this year. But there are many points where bargaining could bog down. Sharply competitive conditions in the industry have weakened labor's position, heightened likelihood of an agreement calling for minimum cost increases.

GAS TURBINE MAY BE STEEL'S NEW HANDYMAN—P. 69
Possibility of using gas turbines as power sources in steel plants was discussed at Power Conference last week. U. S. Steel working with Westinghouse and Jones & Laughlin working with General Electric have been exploring possibilities for powering blast furnace blowers. Would burn waste gas or oil.

SURVEY CHARTS WHO WORKS WHERE, AT WHAT—P. 70
A new Bureau of Labor Statistics study has charted shifts in geographic employment patterns for the period 1939 to 1952. All nonagricultural occupations are included, with construction showing the greatest percentage increase. Geographically, California and Texas registered the largest percentage growth.

BDSA UNSNARLS MATERIALS SYSTEM RED TAPE—P. 79
Business and Defense Services Administration has scheduled its long-delayed simplification of the Defense Materials System. It is effective Apr. 1. Actual changes are few. The control framework remains intact but a substantial number of firms are removed from control and reporting provisions.

SEEK ECONOMY IN STANDARD AUTOMATION — P. 84
Growing adoption of automation in the auto industry provides golden harvest for equipment makers. Attempt being made to standardize mechanization to cut costs. Complete standardization unlikely but progress will be made. Next big area of conquest may be in handling sheet steel for presses.

IKE VOICES CONFIDENCE IN U. S. ECONOMY — P. 89
President Eisenhower's strategy for long-pull prosperity is now clear: Boost spending power, rather than rely on public works or handouts. Tax reduction is Administration's strongest hypo to boost buying incentives for both industry and the consumer. "Make-work" projects, despite rumors, are out.

Engin Lib.
Mich.

the Week in Metalworking

ENGINEERING & PRODUCTION

NEW METHODS FOR FINISHING POWDER PARTS—P. 125
New finishing techniques now make plated powder metal parts superior in corrosion resistance to metal parts plated by standard methods. Improvements apply where corrosion resistance is coupled with other desired factors such as decoration, electrical contact or conductivity and solderability.

TEST CHECKS STAINLESS STRESS CORROSION — P. 130
Type 410 stainless steel can be tested to determine whether stresses are high enough to cause cracks in subsequent service. With some modifications it may also be used for similar or related alloys. Degree of stress is determined by study of exposure time and temperature of testing solutions used.

PLANNED SAFETY REDUCES PRESS ACCIDENTS — P. 134
Better press methods and improved safety devices can sharply reduce punch press accidents. Wider use of mechanical loading and unloading devices, standardization of die designs, and improved safety guards are important factors in eliminating accidents. Improved methods, and equipment boost production, lower costs.

BORIDES: DESIGNED FOR HIGH TEMPERATURE — P. 138
Sintered borides of zirconium, chromium and molybdenum, developed to meet special defense needs, may find applications in industry. The borides are cermets with high melting points, oxidation resistance and high temperature strength. Thermal shock resistance is good, impact strength below cast super alloys.

REDESIGN PAYS OFF IN HIGHER PRODUCTION—P. 140
High speed production and ability to pay off the investment quickly may justify the purchase of new equipment long before older, slower machines are worn out. A Detroit builder of special machine tools, confident this basic automotive tooling philosophy would pay off elsewhere applies it to other machinery.

NEXT WEEK—BETTER FORGING METHODS SAVE STEEL
Use of powerful, vertical all-steel presses in place of the conventional pierce-and-upset, horizontal draw bench has greatly increased production of large hot-forged artillery shells. In addition to manpower saved, many machine hours have been eliminated. Savings to 35 lb of steel per 155 mm shell are possible.

MARKETS & PRICES

MORE FIRMS LEASE CAPITAL EQUIPMENT — P. 68
Despite taxation and legal problems, renting of capital equipment to manufacturing firms continues on the upswing. You can now rent machine tools, conveyor systems, office machines—even air conditioning and sprinkler systems. Leasing is particularly attractive to smaller companies.

SEE MID-MAY PICKUP IN WAREHOUSE SALES — P. 74
Evidence of a fairly early pickup in steel buying continues to mount in spite of the recent down trend in ingot rate. Two market studies just released point to progress being made in correcting the No. 1 market problem—inventories. Warehouse survey indicates 36 pct pickup by May 15.

EUROPEAN STEEL MARKET TURNS UPWARD — P. 77
Long decline of prices and buying in Europe's steel markets is about over. Speculation after start of Korean war built up heavy stockpiles in Schuman Plan countries and these overstocked markets have finally adjusted. Last month they passed the dead center point in supply-demand. Buyer's market is gone.

WHAT IF THE ECONOMY'S SLUMPING IN MAY? — P. 97
Administration has circled April and May as the new critical period in the economy. But what if slump continues through May? Previously the President indicated new personal income tax cuts might be forthcoming. But will he be able to propose new tax cuts after his recent argument against more cuts.

STEEL FUTURE LOOKS BETTER THAN PRESENT — P. 165
Looking ahead in the steel market is much pleasanter than discussing the present market. But there are some stirrings of renewed activity that may boost operations a month or two hence. Rate of new orders is climbing slowly, but tonnage gain is small. Scrap prices were up for the second week in a row.

BOOSTED STOCKPILING WILL AID METALS — P. 168
White House has directed mobilizers to provide a new look in stockpiling—with new, higher goals. Actually aimed at long-term military security, it comes as good news to hard-pressed metal producers. List of materials to be accelerated hasn't been released but insiders say lead, zinc, tin are on it.

AJAX-NORTHRUP
HIGH MELTING SPEED

saves more than just TIME

Time saved . . . more heats . . . increased production are obvious benefits of AJAX-NORTHRUP Hi-Speed Induction Melting. Perhaps not so obvious, however, are many additional savings . . . important whether you have one melt a day or twenty.

The AJAX-NORTHRUP Induction Furnace melts so fast that there is practically no chance for oxidation. Without electrodes or combustion gases, there is almost complete freedom from contamination of any kind. Metal losses are virtually eliminated. Savings in even the base metals are substantial. In the costly and more easily oxidized alloying metals, savings are so large as to seem unbelievable . . . but they are true. A foundry casting 18-8 type alloys reports 100% recovery of nickel; 99% chromium; 95% molybdenum and similarly large percentages of every alloying element. A typical non-ferrous foundry reports reduced melting costs of over $33.00 a ton.

These savings can be realized in *any foundry*, ferrous or non-ferrous, providing an excellent return on your original investment in AJAX-NORTHRUP equipment.

We would be pleased to show you actual cost data that other AJAX-NORTHRUP Furnace users have made available. Just write or telephone us.

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Indexed in the Industrial Arts Index and the Engineering Index.

ABC AUDITED PAID CIRCULATION

Society of Business Magazine Editors

BPA Business Publications Audit

NBP National Business Publications

The Customer Gets A Break

THERE is a festive feeling among customers. Not since 1939 have so many sellers tried to impress so many consumers. The tide has turned. The customer is king in almost every field.

No one (least of all the sellers) should deny the buyers their new feeling of importance. They have earned it. If some purchasing people keep salesmen waiting a minute or two longer than seems necessary it should be understandable.

Salesmanship, new products and an old-fashioned sales and premium pitch are bursting out all over. This bodes well for our economy. Only during competitive periods have we brought forth the best in production, merchandizing, research and customer relations.

Every avenue to keep customers buying is being explored. Take for instance the vacuum steel caps on bottles which used to be so frustrating to pry off. All that has changed. Housewives everywhere now know about—and many possess—a little steel key which has changed lions into lambs while opening vacuum tops.

How did this change come about? A major cap company saw that the ultimate consumer got pretty mad at the product while attempting to open the jar. In less than a year more than 40 million openers have been distributed free by the company making the caps. Millions of frustrations have been turned into satisfied customers.

The day of premiums is back too. If the seller can give away a record player with each TV set things are looking up for the man on the street. If a set of stainless steel knives can be had for a few 50¢ pieces and breakfast food package tops, who loses?

Auto salesmen are actually phoning potential buyers. It will be no time at all before they will skip the call and bring the car around and give you a ride.

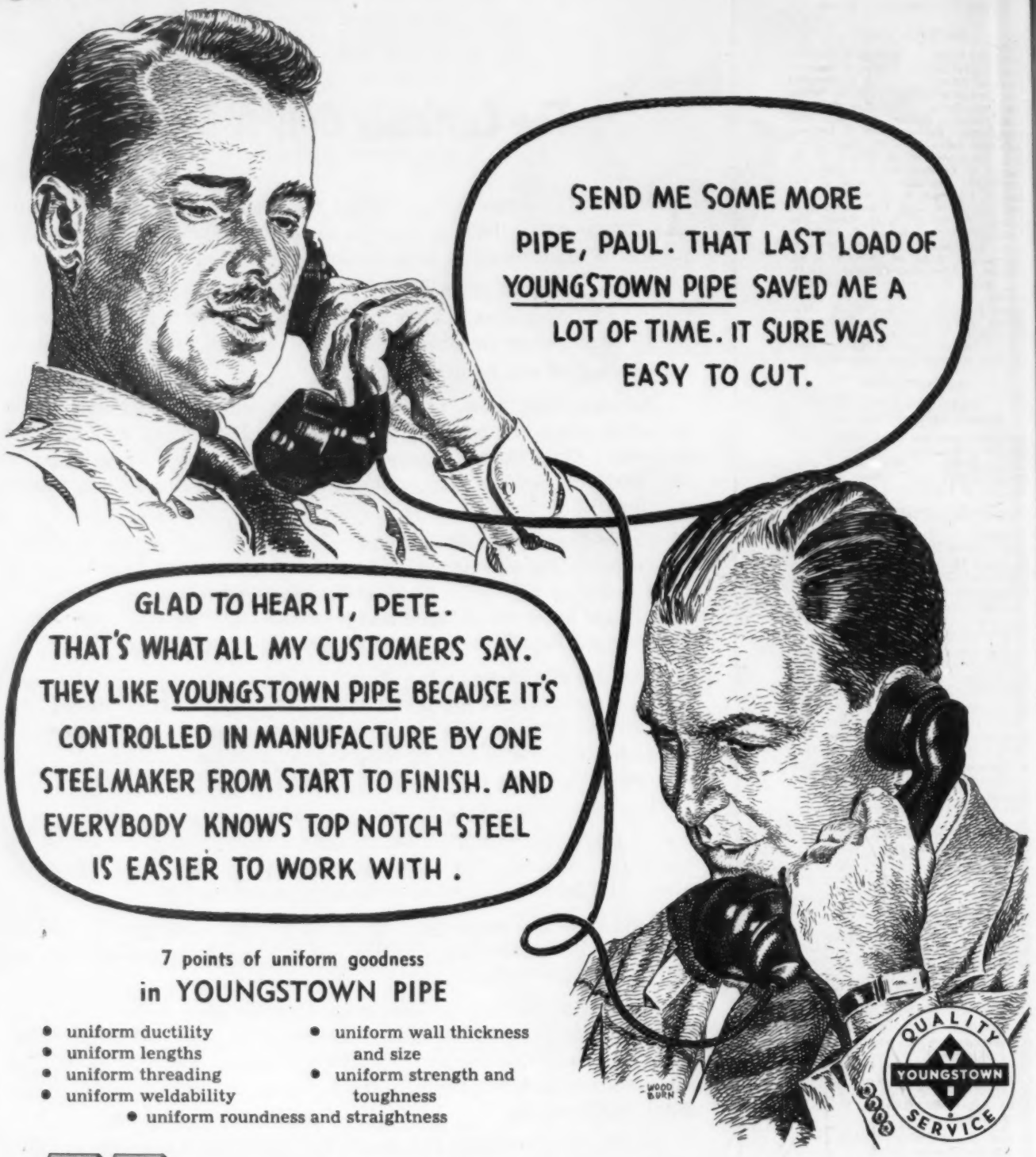
Machine tools may be bought on time or even rented. And to satisfy customers these tools have the latest in color, durability, precision and electronic controls. Machinery firms have trouble-shooting salesmen who seek ways to help the customer in order to further personal relationships.

If you are a customer you aren't human if you don't bask in your new role. If you are on the other end of the stick remember you had your break too. You will still get your break if you always give the customer his.

Tom Campbell

Editor

Contractor calls for YOUNGSTOWN PIPE


SEND ME SOME MORE PIPE, PAUL. THAT LAST LOAD OF YOUNGSTOWN PIPE SAVED ME A LOT OF TIME. IT SURE WAS EASY TO CUT.
GLAD TO HEAR IT, PETE. THAT'S WHAT ALL MY CUSTOMERS SAY. THEY LIKE YOUNGSTOWN PIPE BECAUSE IT'S CONTROLLED IN MANUFACTURE BY ONE STEELMAKER FROM START TO FINISH. AND EVERYBODY KNOWS TOP NOTCH STEEL IS EASIER TO WORK WITH.
WOOD BURN
QUALITY
YOUNGSTOWN
SERVICE

7 points of uniform goodness
in YOUNGSTOWN PIPE

- uniform ductility
- uniform lengths
- uniform threading
- uniform weldability
- uniform wall thickness and size
- uniform strength and toughness
- uniform roundness and straightness

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General Offices: Youngstown, Ohio - Export Office: 500 Fifth Avenue, New York 36, N. Y.

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Dear Editor:

Letters from readers

Utopia Unlimited

Sir:

I will distribute into good hands all the copies you care to send me of "Utopia Unlimited" appearing in your Feb. 18 issue. Splendid and so badly needed!

L. A. WILSON
Wilson Research, Engineering & Exploration Co.
Veyo, Utah

Solderless Joining

Sir:

On the Newsfront page of the Mar. 4 issue the following statement was made:

"Strong joints are reported possible with a new aluminum powder flux that requires no aluminum solder . . ."

I wonder if it would be possible to obtain more information on this product.

E. S. BUNN
Chief Metallurgist
Revere Copper & Brass, Inc.
New York

Further information may be obtained from Dr. J. L. Wyatt, assistant technical manager, Horizons, Inc., 2891 E. 79th St., Cleveland 4, Ohio.—Ed.

Tantalum Tubing

Sir:

On p. 71 of your Mar. 11 issue you refer to pure tantalum being made into seamless tubing. This is the first we have heard of such a thing being accomplished.

We would appreciate any information you have about who is conducting this research and any details you might have about the experiment itself.

If you know of any applications in which pure tantalum tubing is currently being used other than in the heating of pickle acid tanks, we would appreciate your listing them.

E. K. HUTCHISON
Mgr., Commercial Research
National Tube Div.
U. S. Steel Corp.
Pittsburgh

Contact Dr. L. R. Scribner, Fansteel Metallurgical Corp., North Chicago, Ill., for further information.—Ed.

Clarification

Sir:

We have read with much interest your article on the new slabbing mill at Great Lakes Steel Corp.

We are particularly interested in your statement that "the world's largest steel ingots for flat rolling are being slabbed on Great Lakes Steel Corp.'s new 45 x 90 in. universal mill . . ." We can't help but believe that as the statement reads, it is incorrect.

While we fully agree that a 20-ton ingot is by most standards a large one, we regularly produce ingots weighing up to 76 tons for rolling into flat plates. The size of these ingots is 123 x 108 x 40 in. From this 76-ton ingot we obtain a finished plate weight of 47½ tons.

Because of our belief that we produce the world's largest steel ingots for flat rolling we are naturally very much interested. We would, therefore, appreciate hearing from you with regard to the matter. Very possibly we have misunderstood something.

W. BUTLER, 3RD
Mgr. Advertising & Sales Promotion
Lukens Steel Co.
Coatesville, Pa.

When we talked about the world's largest steel ingots for flat rolling in the Great Lakes story we were speaking, of course, about light gage steel. We were well aware that larger ingots are regularly rolled into heavy plates.—Ed.

Powder Tools

Sir:

We are very interested in the article on powder-activated tools, appearing in your Dec. 18, 1952 issue, as we are concerned with this type of equipment.

Your publication is well known for complete and accurate treatment of this type of material and we would like to obtain reprints or a copy of this article.

D. H. ROSS
Unisco, Inc.
New York

Water Purifier

Sir:

We have read with interest an item in your Mar. 18 issue regarding a water purifying process recently imported from Europe which may have applications in metalworking and metal producing.

Is there any possibility of our obtaining any more information on this process?

D. KAYSEN
Meldrum Mfg. & Engineering Co.
St. Paul

More details may be obtained from Bond & Starr, Inc., 248 Fourth Ave., Pittsburgh 22, Pa.—Ed.

Plated Locknuts

Sir:

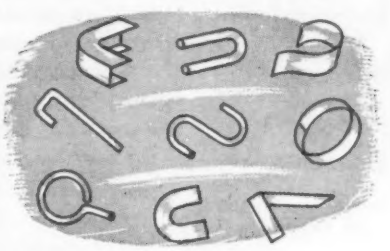
Kindly send me six copies of the article "Plated Locknuts Reduce Galling in Titanium Bolts" which appeared in your Feb. 11 issue.

E. S. BURDICK
Crucible Steel Co. of America
Los Angeles

HIGH SPEED PRECISION BENDING with DI-ACRO* Hydra-Power Bender!

Simple and complex bends are readily formed and duplicated in many ductile materials with hydraulically operated Di-Acro Benders. The Bender can be delivered completely tooled for bending moulding, extrusions and other solid materials. Tooling can be made in your own plant if you prefer.

**pronounced Die-ack-ro*



To be displayed and demonstrated at the A.S.T.E. Show Philadelphia — BOOTH 1403— April 26-30.

Send for catalog

Creators of "Die-Less Duplicating"

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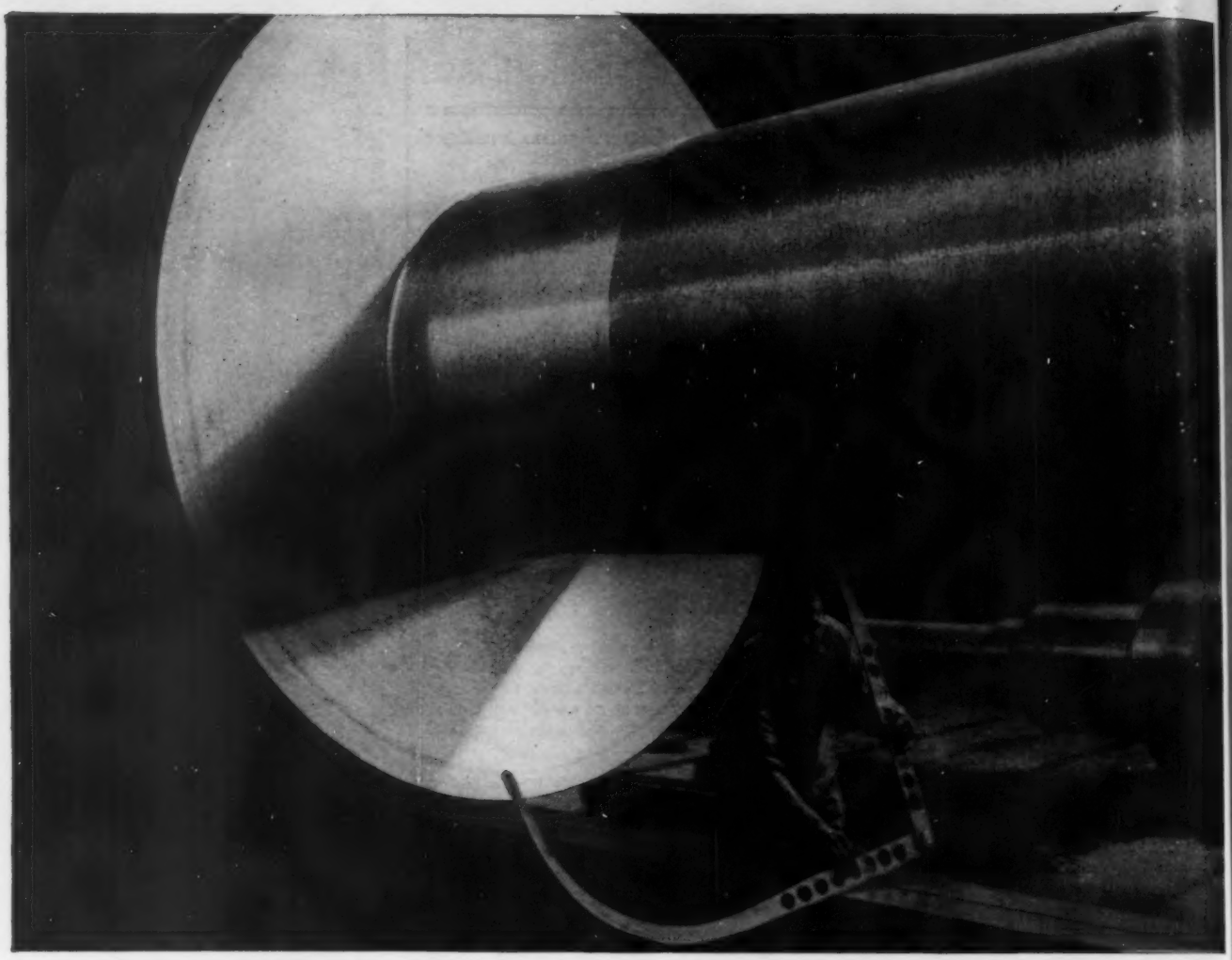


SHAPING THE SHAFT THAT TAMES WATER POWER

Product — shaft for hydro-electric generator
Overall Length — 22'8¾"
Flange Diameter — 80⅛"
Body Diameter — 34½"
Weight — 100,600 lbs.

When a hydro-electric turbine is built it must last for scores of years. That is why leading builders of this equipment come to Midvale regularly for shaft forgings.

This large 22-foot shaft being given the final check is an example of Midvale production. Exact in metallurgical specifications because of the experienced steel making practices and complete open hearth and electric furnace facilities to fit the job. Carefully forged by hands with years of forging skill on presses from 1,500 tons to 14,000 tons capacity. Heat treated in temperature controlled furnaces to assure stability of structure throughout the shaft with the best combination of strength and ductility. Then machined to final dimensions on lathes especially designed for this type of work.

This is the reason Midvale forgings — whether 300 or 300,000 pounds — are noted for their long service and never failing performance. The men of Midvale working with the right equipment and facilities offer a source of forgings, steel mill rolls and rings unsurpassed in quality and extra performance. Let their service, long experience and willingness to solve your problem help you.

THE MIDVALE COMPANY - Nicetown, Philadelphia 40, Pa.

Offices: New York, Chicago, Pittsburgh, Washington, Cleveland, San Francisco

MIDVALE

FORGINGS, ROLLS, RINGS, CORROSION AND HEAT RESISTING CASTINGS

Fatigue Cracks

by William M. Coffey

Women's Page

We have such a large following among the gentle sex that many manufacturers of strictly female stuff look on THE IRON AGE as a natural setting for their publicity releases. They are perfectly correct, of course. We figured once that if we added the wives, mothers, sisters, daughters and secretaries and others to our 150,000 old male readers our readership would be well over a million—enough to give *Vogue, Charm* and *Beauty Parade* cause for worry. But generally we stick to metal unless we spot a particularly good thing like the one explained in the following release from Helena Rubinstein:

"*. . . flying in the teeth of the defeatists who said it couldn't be done, the indomitable Madame Rubinstein has developed Cologne Foam, a sensational new, completely different, fragrant medium. Long-lasting beyond your wildest dreams, this new Cologne Foam, it's fragrance suspended in a propellent, is impressively superior to old-style skin-drying toilet waters . . . luxuriate in the voluptuous haze of your favorite perfume . . . delicately pink and fluffy, is fun to use . . . completely non-sticky and melts delightfully into your skin leaving no aftermath but a subtle, haunting, lasting fragrance. . . .*"

Brother . . .

The Lineup

April 1— 8	National Leave Us Alone Week
April 1—10	National Laugh Week
April 10—17	Let's Play Ball Week
April 11	Daughter's Day
April 11—17	National Noise Abatement Week
April 11—17	National Trimmed Dress Week
April 11—17	Classified Brand Names Week
April 12	Halifax Day in North Carolina
April 18—24	Honey for Breakfast Week
April 19—25	National Hair Care Week
April 25—May 1	National Baby Week

A real exciting month.

Book Reviews

Here are some new best sellers newly released by the Government Printing Office. Just write Superintendent of Documents, Washington 25, D. C.

Men's Work Shirt Sizes, Price 5¢.

Interior Quality of Eggs, Price 20¢.

Driver's Manual, Price 5¢. ". . . . prepared by the *Coast Guard* in the interest of promoting safer driving . . . covers night driving, hand signals, weather driving, negotiating hills, parking, passing and many others." *On Long Island Sound?*

Puzzlers

We received two answers to the train switching puzzler (Mar. 4). Both were very good. Mr. A. M. Truc, Asst. Sales Manager for the Whiting Corporation, Harvey, Ill., writes. ". . . the little puzzle you printed in your March 4 issue was very interesting to me inasmuch as our Whiting Trackmobile is being sold to solve difficult car handling problems such as this. As you can see from the enclosed literature, the Trackmobile operates on both its road wheels and its rail wheels and therefore can solve switching problems in a very efficient manner . . . we know we can solve the problem outlined in your puzzle with the Trackmobile."

And our other answer came from Gus Alsterlund (gUSAlsterlund); "The switching problem is like a bookkeeping entry or posting. It is a well-known fact that engineers are as handy handling debit and credit forms as an expert bookkeeper. With a diagram the problem is merely one of coupling the two cars, using a switch on track to reverse position of said cars and relocating said cars. The bridge is not an obstacle as one or two cars can be used to span the bridge distance. A *très* simple answer might be that the locomotive must operate on tracks, must have operators and fuel." gUSA

New Puzzler

A column of troops goes on a 5-hour march and travels at 5 mph. The length of the column is a constant 5 miles throughout the march. At the beginning of the march a courier stationed at the end of the column is ordered to deliver a message to the head of the column and return. He desires to do this so that he returns to his station just as the day's march is completed, and he wants to use the same speed for the entire trip. What speed should he use?

Many thanks to Mr. R. A. Wester, of the Wester Tool & Machine Co., Denver, Colo., for this one.

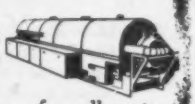
Do a Better Job Faster

cut cleaning costs right down the line

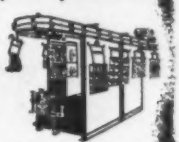
METALWASH PARTS WASHERS, designed for *alkaline-, neutral emulsion-,* or *solvent-type cleaners,* are manufactured in five basic types, with *any cycle,* and in *any size* required.

FOR LIMITED FLOOR SPACE the *roto-table spray washer* handles individual parts or loaded baskets on a steel mesh conveyor travelling in a circle.

FOR CONTINUOUS LINE OPERATION soiled parts are loaded directly on a mesh belt conveyor which carries them through wash, rinse, and dry chambers to the unloading station



FOR CONTINUOUS MASS CLEANING the *rotary drum machine* tumbles a huge volume of small parts through the cleaning cycle by means of an internal helix.



FOR RACKED PARTS the *overhead monorail conveyor* washer is built around your existing plant conveyor, eliminating handling and re-racking.

FOR PRECISION PARTS CLEANING the vertical and horizontal return washers process delicate parts, eliminating possibility of scratching or rubbing.

METALWASH VAPOR DEGREASERS *provide new speed, economy, durability.*

METALWASH SPRAY PICKLING MACHINE is a *production method* in preparation for *enameling, plating, phosphating;* in removal of annealing scale after heat treatment.

METALWASH PHOSPHATIZING MACHINES *provide ideal surface for lasting paint finishes.*

METALWASH®

WASHING PICKLING DRYING PHOSPHATIZING DEGREASING

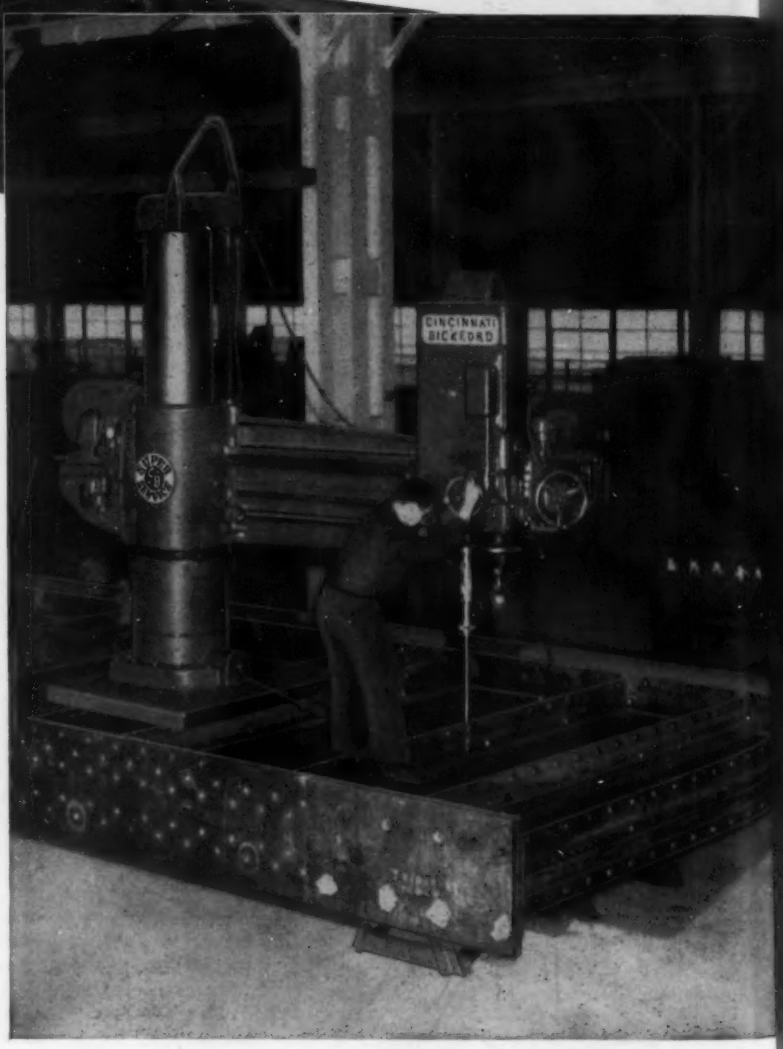
METALWASH MACHINERY CORPORATION
920 North Avenue, Elizabeth 4, N. J.

CINCINNATI BICKFORD

saves 50% to 75%

AT LINK-BELT COMPANY

Instead of positioning this 57,100 pound girder for drilling operations, the machine is moved by crane to the job.



This 6-foot arm, 17-inch diameter column Cincinnati Bickford Super Service Radial Drill is equipped with a lifting bail for portable use on large structural members and base plates where it is much faster to move the machine than the work. The machine is never clamped to the piece or floor for these portable drilling operations since it is properly balanced and of ample weight to neither tip nor rise up while drilling. Various sizes of holes are drilled in the part shown. Savings of 50 to 75 per cent over the previous method which used two men and a portable air drill, have been effected.

Photos made at the new Link-Belt Company plant in Colmar, Pa.

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

THE CINCINNATI BICKFORD TOOL CO.

Cincinnati 9, Ohio, U.S.A.

Dates to Remember

Meetings

APRIL

AIR-CONDITIONING & REFRIGERATION INSTITUTE — Annual meeting, Mar. 30-Apr. 2, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters are at 1346 Connecticut Ave., N. W., Washington, D. C.

CUTTING DIE INSTITUTE — Semiannual meeting, Apr. 1-2, Roosevelt Hotel, New Orleans. Institute headquarters are at 1643 National Bank Bldg., Detroit.

AMERICAN INSTITUTE OF MINING & METALLURGICAL ENGINEERS — Iron & Steel Div., Annual meeting, Apr. 5-7, Palmer House, Chicago. Institute headquarters are at 29 W. 39th St., New York.

METAL TREATING INSTITUTE — Spring meeting, Apr. 5-7. The Homestead, Hot Springs, Va. Institute headquarters are at 271 North Ave., New Rochelle, New York.

EXPOSITIONS

AMERICAN SOCIETY FOR METALS—Apr. 22-24, Hotel Seneca, Rochester, New York. Society headquarters are at 7301 Euclid Ave., Cleveland.

METAL POWDER ASSN.—Annual meeting, Apr. 26-28, Drake Hotel, Chicago. Association headquarters are at 420 Lexington Ave., New York.

AMERICAN SOCIETY OF TOOL ENGINEERS — Annual meeting & biennial Industrial Exposition, Apr. 26-30, Philadelphia. Society headquarters are at 10700 Puritan Ave., Detroit.

AMERICAN FOUNDRYMEN'S SOCIETY —Annual Foundry Congress & Show, May 8-14, Public Auditorium, Cleveland. Society headquarters are at 616 S. Michigan Ave., Chicago.

AMERICAN SOCIETY OF LUBRICATION ENGINEERS — Annual meeting and exhibit, Apr. 5-7, Netherland Plaza Hotel, Cincinnati. Society headquarters are at 343 S. Dearborn St., Chicago.

EDISON ELECTRIC INSTITUTE—Sales Conference, Apr. 5-8, Edgewater Beach Hotel, Chicago. Institute headquarters are at 420 Lexington Ave., New York.

CUTTING TOOL MANUFACTURERS ASSN.—Spring meeting, Apr. 6. Association headquarters are at 416 Penobscot Bldg., Detroit.

INTERNATIONAL ACETYLENE ASSN. —Apr. 7-9, Palmer House, Chicago. Association headquarters are at 30 E. 42nd St., New York.

AMERICAN HARDWARE MANUFACTURERS ASSN. — Southern hardware convention, Apr. 11-14, New Orleans. Association headquarters are at 342 Madison Ave., New York.

THE MATERIAL HANDLING INSTITUTE—Spring meeting, Apr. 13, Drake Hotel, Chicago. Institute headquarters are at Clark Bldg., Pittsburgh.

AMERICAN INSTITUTE OF STEEL CONSTRUCTION—National engineering conference, Apr. 13-14, Schroeder Hotel, Milwaukee. Institute headquarters are at 101 Park Ave., New York.

SHIPBUILDERS COUNCIL OF AMERICA—Annual meeting, Apr. 14. Headquarters are at 21 West St., New York.

NATIONAL PETROLEUM ASSN.—Semiannual meeting, Apr. 14-16, Cleveland. Association headquarters are at Munsey Bldg., Washington.

AMERICAN ZINC INSTITUTE, INC. — Annual meeting, Apr. 20-21, Statler Hotel, St. Louis. Institute headquarters are at 60 E. 42nd St., New York.

CASTER & FLOOR TRUCK MANUFACTURERS ASSN.—Spring meeting, Apr. 20-22. Association headquarters are at 27 E. Monroe St., Chicago.

Like an evil eye, fire is constantly on the lookout for unprotected hazards such as flammable liquids, electrical equipment, materials in process. Get protection that never sleeps. Guard every hazard in your plant with a Kidde Automatic Fire Extinguishing System.

Quick as a wink, check the 'yellow pages' for your local Kidde dealer.

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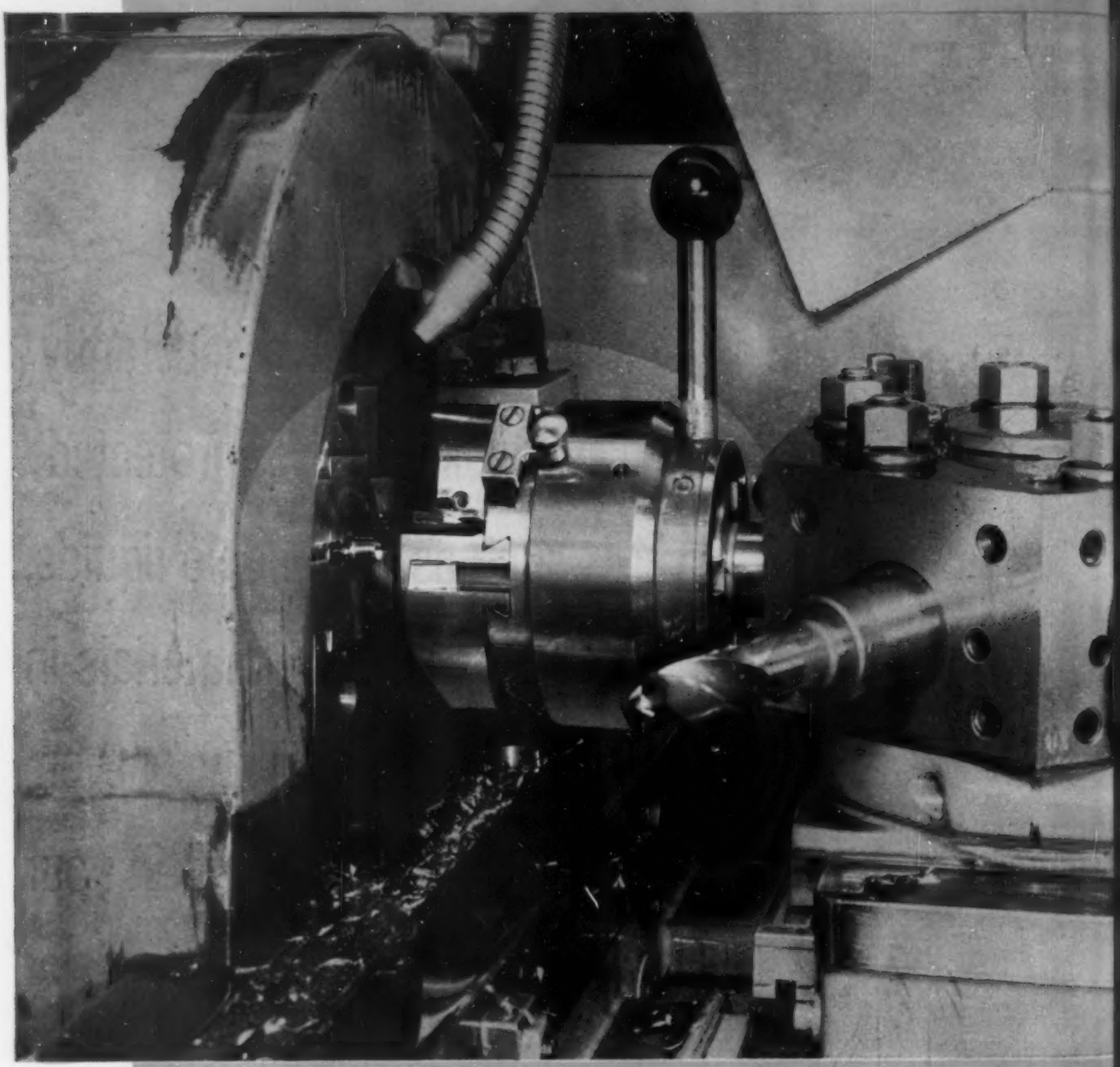
1800 Stainless Steel



see this EQUIPMENT at the ASTE Show BOOTH 1738

LANDIS *Machine* COMPANY

WAYNESBORO · PENNSYLVANIA · U. S. A.

THE WORLD'S LARGEST EXCLUSIVE MANUFACTURERS OF THREAD GENERATING EQUIPMENT

the Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

COMMON LANGUAGE MACHINE CONCEPT of business data processing is on verge of another major development. That is the linking of electro-mechanical machines with an electronic "brain." Tieup would be done by converting punched tape to magnetic tape for feeding into electronic computor.

TOOLING EXPERTS ARE NOW SKEPTICAL of Chevrolet's chances of having the new V-8 engine ready for mass production in time for 1955 model introductions. Some equipment just now being ordered can hardly be in operation that early. Pontiac's tooling is on schedule for 1955, although this is a year behind the original timetable.

METAL STAMPERS EXPECT BUSINESS TO IMPROVE gradually through 2nd quarter, then enter a question mark period during summer months. Doubts about 3rd quarter have been raised by fear that political angling may delay formulation of a sound tax policy.

A NEW GLASS LATHE HAS BEEN DESIGNED for specialized glass work in laboratories and in certain types of production operations. Applications include ring seals, tees, flanges, closures, and glass fusings.

SERIOUSNESS OF THE PLIGHT of independent automakers will be more apparent when all financial reports are in. The last half of the year, when sales dropped dangerously, was financially disastrous.

PRIVATE FINANCING OF DAMS by aluminum producers in the Pacific Northwest is becoming a strong possibility. Alcoa has stated its willingness to spend its own money. Kaiser is surveying a site for a dam on the Columbia river. Reynolds, with two reduction plants in the area, has stayed mum so far.

MORE DEPENDABLE SOURCE OF PROCESS STEAM for its powder factory at Indian Head, Md., is being built by the Navy. Under construction is a $4.5 million plant designed to provide steam and improve reliability of electric power. Present plant is 40 years old.

AN EXPERIMENTAL "THERMOMETER" containing rods of uranium, cobalt, nickel and manganese is being given a trial by army dentists. This instrument records tooth temperature and is expected to speed detection of various dental infections.

EVEN THOUGH GAS TURBINES CAN PERFORM satisfactorily in passenger cars, volume production looks like a long range project. There are many manufacturing obstacles and the problem of supplying potential demand for strategic materials seems a long way from solution.

AN IMPROVED METHOD OF TESTING 410 STAINLESS tells whether stresses, other than residual stresses, are high enough to cause cracks in subsequent service. With some modifications the test can be used for related alloys.

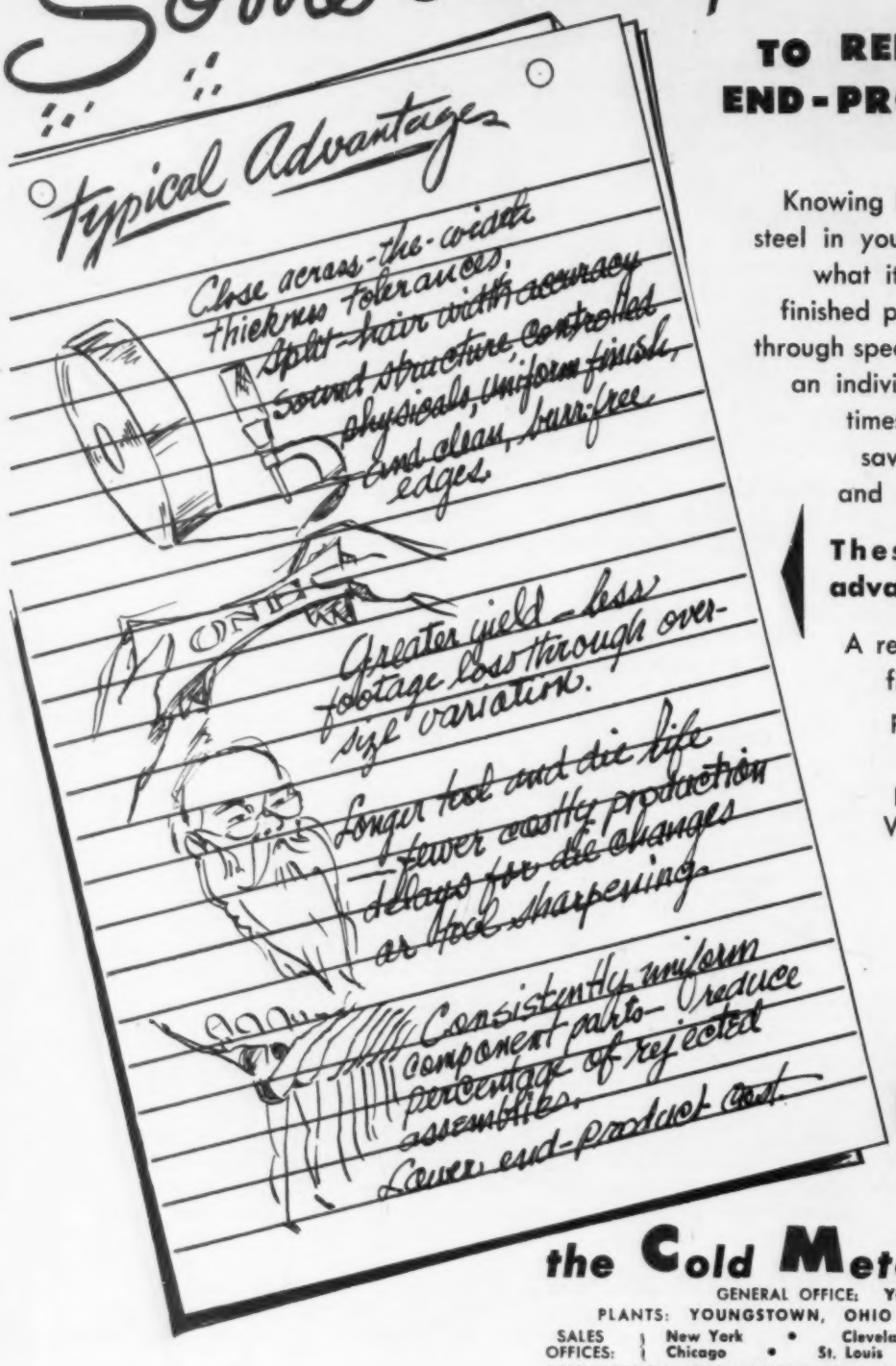
A SMALL RADIO TRANSMITTER in a probe is being used to gage level in bins and tanks. At point of control noise from material rising and falling about the transmitter keeps tabs on bin level. Reporting instruments can be spotted 300 feet or more from probe.

CMP

COLD ROLLED STRIP STEEL OFFERS

Some Wonderful Ways

TO REDUCE END-PRODUCT COSTS


Typical Advantages
Close across-the-width thickness tolerances, Split-hair width accuracy
Sound structure, controlled physicals, uniform finish, End clean, burr-free edges
Greater yield—less footage loss through over-size variation.
Longer tool and die life—fewer costly production delays for die changes or tool sharpening.
Consistently uniform component parts—reduce percentage of rejected assemblies.
Lower end-product cost.

Knowing how you use cold rolled strip steel in your fabricating operations and what it is called upon to do in the finished product . . . CMP can develop through special processing for those needs an individual strip product that many times makes possible important savings in fabricating, assembly and end-product costs.

These are some of the advantages you can count on

A review of your strip steel specifications in terms of what CMP precision strip steel can do for your product betterment may prove mutually advantageous. We will welcome your invitation to call.

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WAGES: Steel Gravy Train Slowing Down

Sales competition in steel industry weakens union bargaining position . . . Any wage rise would be small . . . McDonald expected to stress benefits, pensions—*By J. B. Delaney.*

The odds favor peaceful settlement of steel contract negotiations this year. But there are many points on which bargaining could reach an impasse.

Sharply competitive conditions in the industry have weakened labor's bargaining position, heightened likelihood of an agreement calling for minimum cost increases for steel producers.

Less Production Pressure

If there is any wage increase at all, the most the steel workers can hope for is a "token" advance of a few pennies. Even last year, when wages went up about 8½¢ per hour, the producers' original position was 5¢.

Steel producers last year immediately advanced prices an average of $4 per ton to offset the increased wage costs. Steel extra charges also were increased. But this year the customer is in no mood to take a price advance for any reason. In fact, freight absorption, elimination of premium base prices and shaving of extra charges are now commonplace, cutting the net return to the producers.

In the last 6 months steel producers have shifted emphasis from production to efficiency and cost reduction. With the ingot rate now below 70 pct of capacity and likely to be little better at contract time, pressure to produce is no longer an incentive to go along with union demands.

Guaranteed Wage Dead?

Principal issues that David McDonald, president of the United Steel Workers, is expected to advance are demands for improvements in the social insurance and pension programs. He will win concessions on both, but he will have to compromise. Mr. McDonald would like to establish minimum pension payments at least one-third higher than the present $100 per month, and wants the steel producers to bear the entire cost of a greatly-expanded social insurance program. Under the present set-up the cost is split 50-50 between the worker and the company.

The Union's arguments on pensions will be that rises in the cost of living since 1949, when the program was negotiated, make present benefits inadequate. They also argue that cost to the steel companies has decreased due to higher Federal Social Security payments which are tied in with the program.

Union officials and publications have continued to emphasize the objective of a guaranteed annual wage, and the issue probably will be tossed into the pot again this year. But nothing is expected to come of it, even though spreading unemployment in the industry makes it a potentially hotter issue than in previous negotiations. For this reason some steel executives believe the guaranteed wage will be a dead duck after this year.

PENSION BOOST is sought by David McDonald of United Steelworkers.

Push Work Spreading

No one is taking seriously the possibility that Mr. McDonald will press for a 6-hour day with maintenance of income to spread employment in the industry. Mr. McDonald first mentioned the issue in a Pittsburgh speech last month. He hasn't brought it up publicly since. A 6-hour day would automatically increase employment costs 25 pct.

Formal union demands will be drawn up by the International Wage Policy Committee some time next month. The contract expires in its entirety on June 30, and the union must serve notice of its intention to reopen on or before May 1.

In view of layoffs in the industry, the union is expected to move for addition of spread-the-work clauses in individual contracts that do not include such provisions. Some agreements call for sharing employment equally in a department until the average work week falls below 32 hours. Not until then is the worker with lowest seniority laid off. Besides giving everybody a better break, the provision is advantageous to the union from a dues-collecting standpoint.

Faces Second Test

The holiday work provision is another live issue with some union locals. The clause provides that a man must work the day before and the day after a holiday in order to collect holiday pay. Only excuses are personal illness or a death in the family. Some companies have insisted upon strict observance of this provision, and the union may seek to liberalize conditions.

The 1954 negotiations will be Mr.

EQUIPMENT: Leasing Continues Growth

More manufacturing firms are renting capital equipment . . . CTA proposes depreciation changes . . . Cite special advantages for smaller companies—By K. W. Bennett.

Despite a welter of taxation and legal problems, leasing of capital equipment to manufacturing firms continues its upswing. At present, it is just about possible to start a major plant into full tilt operation with a scattered handful of rental payments.

Leasing arrangements are available on machine tools new and used, conveyor systems, office machines, trucks, welding equipment, X ray equipment, materials handling equipment, office machines—even a plant air conditioning system and sprinkling system are available on lease.

Would Make Changes

Council for Technological Advancement's study of leasing, released this week, seemed to confirm the advantages, both for lessor and lessee, of leased capital equipment. Though CTA and its affiliate, Machinery & Allied Products Institute, made it clear that they held no brief for capital equipment leasing and weren't seeking to promote the movement, their report brought to light some inherent good points in leasing and indicated that there are at least some possible solutions to thorny taxing and legal problems currently besetting leasing arrangements.

At present, courts frequently find that a lease, with an option to purchase clause included, constitutes a conditional sale. Therefore, the user of the equipment, the lessee, must pay presently unallowed depreciation as he would on a piece of his own capital equipment.

Purchase Optional

The CTA suggestion: that an option to purchase clause not convert a leasing arrangement into a conditional sale, as is often happening under present court interpretation; and that a declining balance depreciation method be used, at twice the currently applicable straight line rate, for the party who has to pay depreciation.

Simply, the second suggestion means that two-thirds of the cost of the machine tool or other leased property, would be written off in the first half of the machine tool life.

On a $10,000-machine tool with a 10-year life, the straight line depreciation would be 10 pct, with $5000 depreciation at the end of the first 5 years. The CTA suggested depreciation would amount to $6723 at the end of the 5-year period.

Revise Depreciation

A further corollary in the CTA study is the suggestion that depreciation on a piece of leased equipment be plus-or-minus 15 pct over owned capital goods depreciation. In use it's been found that depreciation on leased equipment often runs higher than the rate of wear on equipment being used in the owner's own shop, pushing the plus-or-minus to the plus side.

The CTA suggestion amounts to more than mere talk. The material has been placed before the Internal Revenue Service for consideration. There's been a strong push for revising depreciation methods. With the submission to Congress recently of MAPI findings on depreciation based on work by a number of metalworking firms, the CTA and MAPI reports should be a double-barreled tool for seekers of a depreciation revision.

Cites Advantages

But the CTA report is aimed primarily at leasing. Particularly for the small plant, leasing would allow the shop with little capital to take advantage of new equipment developments quickly, permit a product shift quickly by the return of one machine and lease of another, or enable retaining badly needed capital in a period when money is tight.

One thing is certain. Leasing would require the entry of more money into the capital goods field. This would be through financial firms, particularly insurance companies, who would finance long term leasing of capital equipment.

Leases currently are usually short and generalized in their wording. Rentals are based on actual output of the leased item, or a fixed rental charge, or a combination of both. Rentals are constructed to recover the value of the machine plus normal investment of the return over a specified period, with taxes and assessments paid by the user, the lessee.

Costs for insurance, maintenance, supplies and accessories, repairs, and alterations can be paid by either party, depend on the individual lease and there seems to be no particularly clear-cut trend, though leases will probably grow longer, more technical.

Overall, there is one definite trend. Leasing is expanding, and it looks as though it'll be getting easier.

Special Report

Continued

McDonald's second test as leader of the USW. It was generally agreed that he came through with flying colors last year, obtaining a wage increase and other concessions, including complete elimination by July of 1954 of the North-South wage differential. The amicable settlement did a lot to erase bitterness over the 54-day strike of 1952.

Since then, Mr. McDonald and steel producers and fabricators have been working to improve union-management relations from the front office to the local level. Most publicized of these efforts were the visits of Mr. McDonald and Benjamin F. Fairless, president of U. S. Steel Corp., to various operating divisions of that company. The primary aim is to improve day-to-day relationships and thus avert disputes that might lead to strikes or slowdowns.

POWERFUL PACKAGE, Chrysler's new regenerative gas turbine is equivalent to 160 bhp piston engine. Supervising its installation in 1954 Plymouth is George J. Heubner, Jr. in charge of Chrysler's gas turbine development.

GAS TURBINE: Steel's New Handyman

Versatile, flexible turbines promise easy maintenance, lower costs . . . Burn waste gases to drive blast furnace blowers, make electricity . . . Built by GE, Westinghouse.

Two weeks ago came word that Chrysler had fitted a stock model Plymouth with a gas turbine engine. With Chrysler's move, it appeared that just about everybody was crowding aboard an already crowded wagon.

At Chicago last week, the use of gas turbines in steel plants, operating on blast furnace gas, was discussed in detail. Occasion was the 16th annual American Power Conference.

As early as 1952, U. S. Steel and Jones & Laughlin, working with Westinghouse and General Electric respectively, began discussion of a test program to determine the usefulness of gas turbines burning blast furnace gas, th turbines to be employed in the .eel mill producing the gas.

Use Different Fuels

In a report by George Krapf, U. S. Steel, it was indicated that the gas produced by blast furnaces can be used in a gas turbine as efficiently as fuel oils or gases with no detrimental effect to the turbine itself, and that the turbine can be operated full time on the gas with standard fuel oils as a standby fuel. A dual fuel nozzle permits the switch from blast furnace gas to diesel oil.

There are more than a few ancient gas engines installed in integrated steel mills today furnishing power for blast furnace blowers. Their drawbacks are costs in maintenance and manhours are too high and they occupy too much space.

Flexible Power Supply

The gas turbine, Mr. Krapf suggests, promises lower operating costs than even the steam plants that have replaced many of the older gas engines. Turbines mean reduced water requirements, possibly lower investment cost.

With regard to steel mill electrical power demands: at present gas turbine units capable of producing the 30,000 to 60,000 kw output of large steam turbo-generator units aren't foreseen, but 5000 to 15,000 kw installations are completely in order. For the isolated mill with lower electric power requirements, the gas turbine is feasible.

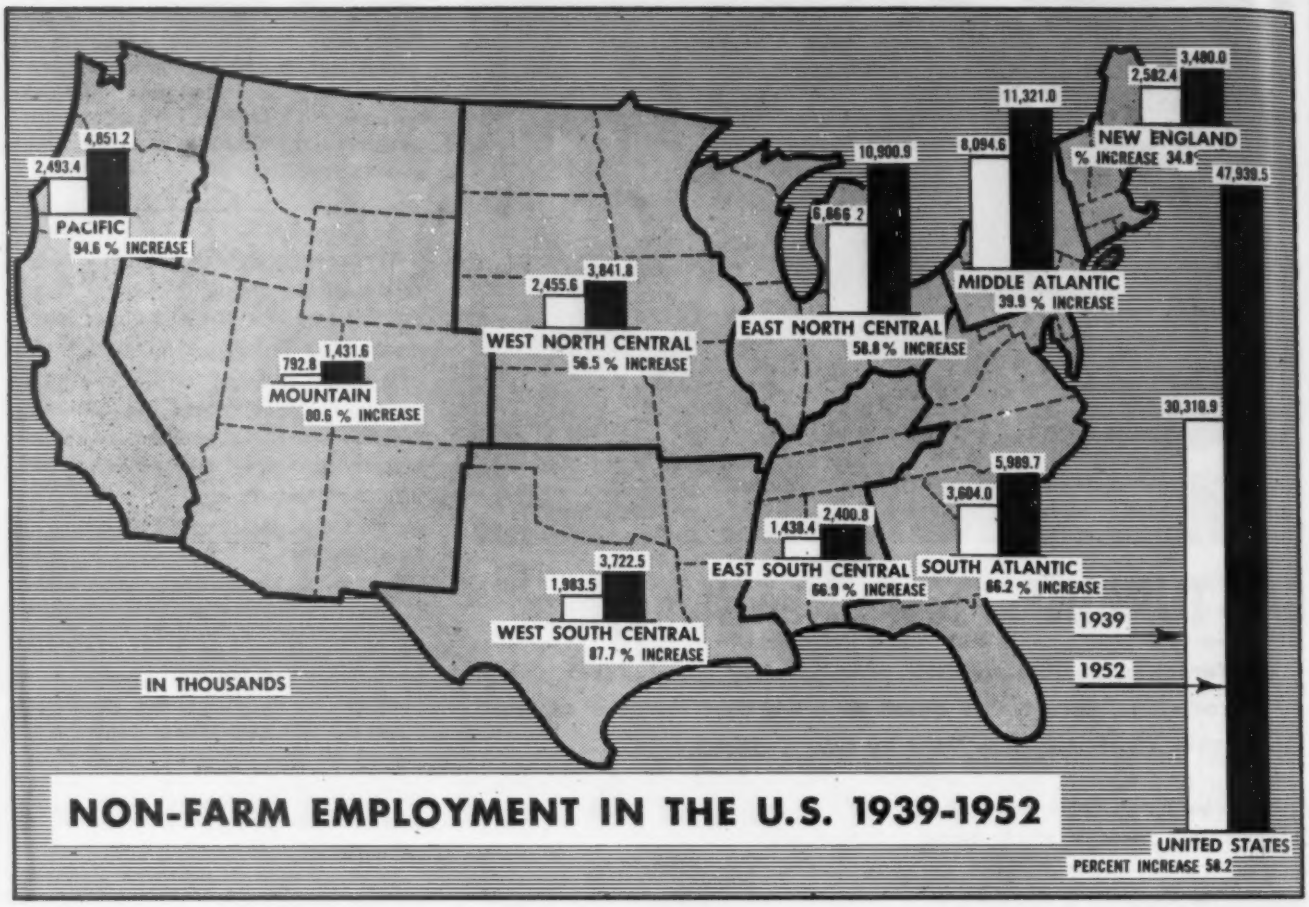
In operating blowers for a blast furnace, however, the gas turbine could hit its full stride. Steam generators currently used are planned to handle three or more blowers. As new steam generators are added, there is apt to be an overcapacity of power. Gas turbine-driven blowers could be installed in units to fit the exact power needs.

Both Westinghouse and General Electric have designed gas turbine units specifically for blast furnace blower operation. Westinghouse has suggested a three-stage gas turbine, General Electric a cycle built around three of their 6000-hp gas turbines employed in driving one blower apiece. The blowers would operate in series, each blower contributing about one-third of the required total pressure increase.

Titanium Formed at 1800°F

Titanium is being experimentally formed at 1800°F on unique rope-type drop hammers at Rohr Aircraft Co., Chula Vista, Calif., aircraft power package builders.

To speed up the forming process for commercial plane engine nacelles, a wide variety of temperatures has been attempted and 1800°F found best for the configuration involved. Sheets are heated in an electric furnace immediately adjacent to the hammer, then quickly subjected to a few hammer blows, then reheated. The huge rope hammer has a 5-ton head with 5 ft stroke.



JOBS: Who Works Where, At What?

New BLS study charts shifts in geographic employment patterns . . . Covers 1939-1952 period . . . California, Texas show greatest percentage gains . . . Construction leads industry.

American industry's unprecedented growth during the last two decades has changed the face of the country and brought profound changes in the way of life of millions of workers.

These changes are spotlighted in a new Bureau of Labor Statistics study, *The Changing Geography of American Industry*, by Seymour L. Wolfbein of BLS. The study charts shifts in nonagricultural employment patterns by states and major regions for the period 1939 to 1952.

During that time, U. S. nonfarm employment shot from a little over 30 million to 48 million jobs.

Increases affected all states and regions, but to varying degrees in different areas and fields. Overall its greatest impact came in a tier of states rimming the country all the way from the West Coast through the Southwest, Gulf and South Atlantic states. Star performers were California and Texas, both of whom more than doubled their nonfarm employment. In 1952 these states accounted for just under 6 million nonfarm jobs.

By regions, the Pacific states showed the greatest overall gains. 94.6 pct, followed by the Mountain states with 80.6. East and West South Central and South Atlantic states increased nonfarm employment by 66.9, 87.7 and 66.2 pct respectively. At the bottom of the list were the Middle Atlantic states with 39.9 pct and New England with a low 34.8 pct total.

All the states in New England and the Middle Atlantic area with the exception of Connecticut showed increases well below the national average: 39.9 pct for Middle Atlantic and 34.8 pct for New England. More jobs in finance, insurance and existing metalworking centers were responsible for Connecticut's rate of 51.3 pct.

Between the extremes, the American heartland, the East and West North Central sections, showed employment gains of 58.8 and 56.5 pct, just about the national average. Major new capacity for munitions accounted for the largest state increases in these areas—Kansas with 84.5 pct and such metalworking centers as Ohio, Indiana and Michigan with 68.0, 65.4 and 63.8 pct.

On an individual state basis, New York and Pennsylvania have retained first and second place for overall nonfarm employment. But

California has captured third place from Illinois. Other changes between 1939 and 1952 among the top 15 states:

Employment By States

State	Employment 1939 (000 omitted)	Employment 1952 (000 omitted)	Rank 1939	Rank 1952
New York	4,178	5,865	1	1
Pennsylvania	2,672	3,667	2	2
Illinois	2,279	3,313	3	4
California	1,812	3,662	4	3
Ohio	1,759	2,954	5	5
Massachusetts	1,350	1,871	6	9
Michigan	1,348	2,208	7	7
New Jersey	1,244	1,790	8	8
Texas	1,071	2,215	9	6
Missouri	821	1,264	10	11
Indiana	814	1,348	11	10
Wisconsin	667	1,080	12	12
North Carolina	612	987	13	13
Connecticut	589	*	14	*
Minnesota	538	*	15	*
Virginia	*	879	*	14
Georgia	*	874	*	15

* Not in first 15 States.

On an industry-by-industry basis, **Construction** lived up to its traditionally volatile reputation, registered the largest percentage gains of any nonfarm occupation. Only 2 out of 48 states failed to show a larger share of workers in construction in 1952 than in 1939.

Nationally, the industry showed an increase of 120.1 pct, with the Pacific states registering a whopping growth of 178.0 pct. The Mountain states followed with 152.7 pct. Other areas:

Construction Gained Fastest

Region	Pct Increase
Total U. S.	120.1
New England	79.7
Middle Atlantic	75.9
East North Central	143.1
West North Central	101.5
South Atlantic	119.2
East South Central	140.3
West South Central	151.4
Mountain	152.7
Pacific	178.0

It's interesting to note that construction is the only industry (except for the small mining group) in which California outranked New York in number of workers in 1952. In 1939 California had only half as many workers in this field as New York.

No matter what your politics, there's no denying that government has grown drastically since 1939. Employment at all levels—local, state and federal—rose 67.6 pct, second only to construction. Not too surprisingly, greatest gains came in areas most recently shifting from agricultural to industrial:

Government Employment Soared

Region	Pct Increase
Total U. S.	67.6
New England	39.6
Middle Atlantic	50.3
East North Central	55.6
West North Central	34.3
South Atlantic	90.8
East South Central	69.7
West South Central	86.1
Mountain	88.4
Pacific	133.7

"Westward Ho" was the theme during the period of the study for **Manufacturing**, which accounts for the single largest block of nonfarm workers. The national increase was 60.7 pct, close to the national average, but the West Coast showed gains of 123.7 pct and the Rocky Mountains 104.7. Back East, the declining textile industry held New England to 30.9 pct. and the South Atlantic states (heavily influenced by North Carolina) to 48.5 pct.

The Middle Atlantic area lost ground to the Great Lakes states as considerable manufacturing, especially metalworking, shifted to the Midwest. As an example, Pittsburgh in 1953 yielded to Chicago as the nation's No. 1 steelmaking center. Statistics show clearly the westward trend of manufacturing:

Manufacturing Moving West

Region	Pct Increase
Total U. S.	60.7
New England	30.9
Middle Atlantic	44.3
East North Central	69.6
West North Central	89.4
South Atlantic	48.5
East South Central	65.8
West South Central	100.0
Mountain	104.7
Pacific	123.7

In view of manufacturing's numerical size, it's instructive to compare the rankings of the 15 leading states with the earlier table showing the leaders in overall nonfarm employment:

Manufacturing By States

State	Employment 1939 (000 omitted)	Employment 1952 (000 omitted)	Rank 1939	Rank 1952
New York	1,299	1,934	1	1
Pennsylvania	1,040	1,494	2	2
Ohio	754	1,315	3	3
Illinois	706	1,248	4	4
Michigan	626	1,110	5	5
California	384	892	8	6
New Jersey	579	810	6	7
Massachusetts	569	740	7	8
Indiana	350	615	9	9
Wisconsin	256	460	12	10
North Carolina	321	432	10	11
Connecticut	281	423	11	12
Texas	180	402	15	13
Missouri	234	373	13	14
Georgia	189	304	14	15

If you have ever tried to find a really good restaurant outside of a big city, you'll be happy to hear that **Trade** and **Service** are showing healthy gains in the more sparsely populated sections of the U. S. But 22 pct of the more than 10 million jobs in trade are still in the three Middle Atlantic states. Overall the gains are smaller than the national average —55.0 pct for trade and 54.7 pct for service—but they are more impressive in those regions where most people would agree the need is greatest. Contributing to this growth have been such factors as Florida's continuing popularity as a resort, the emergence of Dallas and Los Angeles as style centers, and expansion of trade around military and industrial centers in the South and West.

TRADE

Region	Pct Increase
Total U. S.	55.0
New England	31.5
Middle Atlantic	37.1
East North Central	47.8
West North Central	48.6
South Atlantic	79.9
East South Central	83.4
West South Central	88.6
Mountain	79.4
Pacific	68.4

SERVICE

Region	Pct Increase
Total U. S.	54.7
New England	41.2
Middle Atlantic	47.7
East North Central	47.7
West North Central	47.0
South Atlantic	80.7
East South Central	63.6
West South Central	70.0
Mountain	84.9
Pacific	73.4

The railroad industry is the major factor in BLS' **Transportation and Public Utilities** classification. Confined almost entirely to the Rocky Mountain and central plains, the states involved are mainly major railroad shop centers, especially for the important western interstate roads. The list is comparatively stable for the

100% Inspection Pays as this Federal Electronic Sorting Gage automatically measures 8000 roller bearings an hour. It checks their O.D. and length . . . sorts into 12 acceptable classifications 0.0001" apart . . . sends off-size bearings to "scrap" or "salvage".

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3. **Inspecting and sorting for 9 separate specifications** at a speed of more than 3000 pieces an hour.
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1939-1952 period. But new hydropower installations undoubtedly played an important part in the West's gains:

Transportation Gained 45 Pct

Region	Pct Increase
Total U. S.	45.1
New England	23.7
Middle Atlantic	29.6
East North Central	45.2
West North Central	49.9
South Atlantic	52.2
East South Central	45.3
West South Central	65.5
Mountain	58.2
Pacific	58.4

Finance has naturally grown most in areas where industry has most recently come in. But despite the emergence of important banking, insurance and real estate centers in such places as Houston, Los Angeles and San Francisco, New York still accounts for one out of every five jobs in finance.

South, West Gained Finance

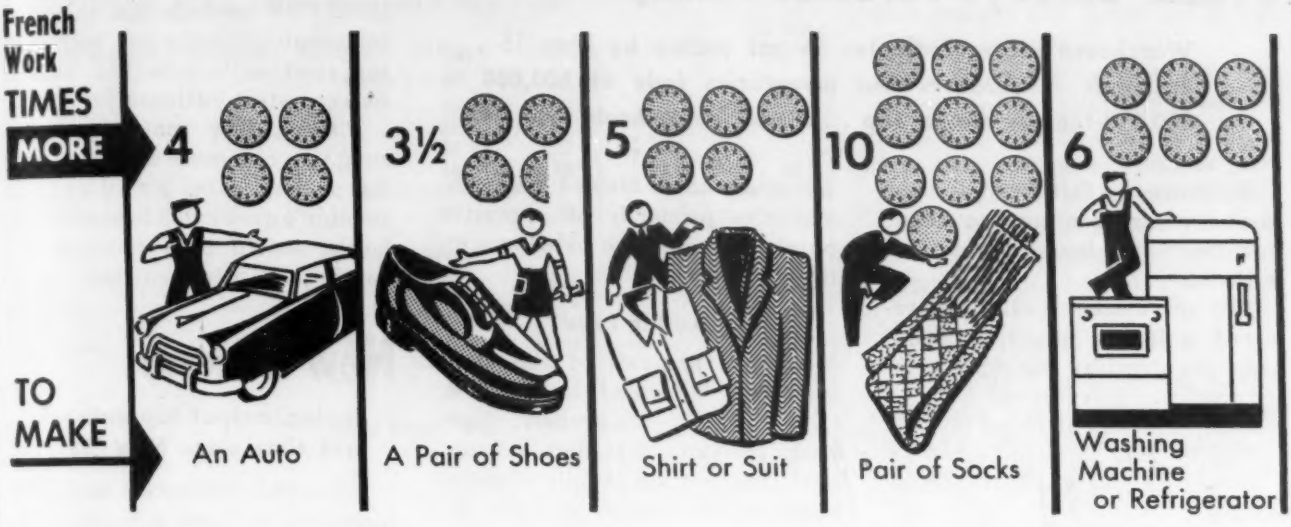
Region	Pct Increase
Total U. S.	42.0
New England	49.6
Middle Atlantic	12.6
East North Central	32.1
West North Central	52.5
South Atlantic	86.2
East South Central	101.7
West South Central	102.7
Mountain	130.5
Pacific	72.2

Mining as a factor in nonfarm employment naturally varies with the geographic distribution of our natural resources. Declines in employment in the Northeast generally reflect declining coal demand and abandoning of depleted or marginal deposits. Overall small increases in employment reflect the emergence of other industries in states which once depended heavily on mining.

Mining Gain Small

Region	Pct Change
Total U. S.	6.6
New England	−29.2
Middle Atlantic	−16.6
East North Central	−4.7
West North Central	14.1
South Atlantic	12.7
East South Central	−10.8
West South Central	65.5
Mountain	10.7
Pacific	−15.4

French Work Longer to Equal American Output



OUTPUT: U. S. Excels Without Magic

French industrialists look for source of U. S. productive power . . . Find no human robots or technical secrets . . . Stress work incentives, people's faith in the economy's future.

Why is it that an American wire-drawing mill can produce 3000 or 4000 ft of wire for every 1000 ft turned out by a French mill employing the same number of men and using essentially the same equipment?

Finding the answer to this question was uppermost in the minds of the French Wire-Drawing Industry's 13-man productivity team, recently in this country under the auspices of the U. S. Foreign Operation Administration's Technical Assistance Program.

Key lies in the different economic positions of the French and American worker, in the incentive an American has to earn more.

Productivity Quadruples

During their intensive, 5-week tour of U. S. wire-drawing plants, the Frenchmen found technical proficiency important but not the determining factor. As Maurice Bonzel, leader of the team pointed out, "Our technical processes are identical, because we know whenever a technical improvement is discovered it soon becomes known in all countries of the world."

A typical example of America's fabulous increased productivity is a Cleveland wire-drawing plant visited by the French. In 1941 this plant's output was 1.6 tons per man per month; in 1953 rate was 6.04 tons.

Get Interested in Machines

Improvement in plant management methods is responsible for some of the increase. But better plant setup and the latest automatic machinery are only part of the answer. As Mr. Bonsel phrased it, "We are convinced that similar results can be obtained in France but not by purely technological improvements. Proof of this lies in the fact that American companies with plants in France find it almost impossible to match their U. S. production figures."

After reading about work simplification, time motion studies, and assembly lines, the Frenchmen expected to find U. S. workers so many carefully trained robots. "The reality is quite different," said Mr. Bonsel. "Research has carried simplification to such a degree that machines now do the work, and the workers, freed from automatic gestures, can get interested in their work and the efficiency of their machines."

The final answer to U. S. productivity lies in teamwork among three groups: (1) industry, (2) labor, (3) business and finance.

American industry realized that the greater the worker's production per hour, the lower the unit cost. Resulting lower prices enable manufacturers to reach wider markets, sell more goods, and lower prices allow workers to purchase more goods.

Great difference between the French and American worker is that there is a definite incentive for the American to become a more efficient producer.

The average American worker spends 30 pct of his income for food—has 70 pct left to spend on services and manufactured goods. The French worker however has to spend 75 pct for food alone.

Finally the liberal credit policy of American business and banking stimulates business.

In concluding the report to French industry, Mr. Bonzel stated: "I cannot help thinking that the buying of a refrigerator on credit is in itself an act of faith." (THE IRON AGE, Apr. 23, 1953, p. 7) "Such an act repeated by 160 million people represents the starting point of an expanding economy."

STEEL: Surveys Forecast Pickup

Warehouse survey indicates 36 pct pickup by May 15 . . . Economic researchers find inventories fade at 500,000 to 800,000-ton per month clip . . . Ingot rate should rise.

Evidence of a fairly early pickup in steel buying continues to mount in spite of slow but steady decline in the ingot rate.

Two new market studies just released point to progress being made in correcting the No. 1 market problem—inventories.

A major pickup of 36 pct in steel buying by May 15 is indicated by a survey of 240 warehouse customers.

Survey mailing was made by Solar Steel Corp., about the middle of February, to warehouse customers east of the Mississippi. Solar operates a chain of warehouses with headquarters in Cleveland.

Inventories of the 240 answering firms average 64 days compared to 58 days they would consider "normal" based on sales. At the same time, inventories reported averaged 14 pct higher (in days) than the same time last year.

Gain Set for Mid-May

Bulk of the executives surveyed (41 pct) indicated they will resume normal purchasing in about 60 days (from time of survey), or the last 2 weeks in April. About 15 pct predicted an earlier return to the market, within 30 days. But 26 pct didn't expect to start normal buying for 90 days, or 'til the end of May. (See table on next page.)

Survey figures indicate steel buying now should be at a rate 4 pct higher than mid-February, and that by Apr. 15 another increase of about 20 pct will take place. By May 15 a 35 pct gain in purchasing (over February level) is indicated. Such an increase would restore 90 pct of the purchasing decline that has taken place because of excessive inventories.

About half the executives answering the survey named decrease in sales as the primary cause of their inventory problem. About one-third blamed heavy inventories primarily on excessive purchasing. Balance listed miscellaneous reasons.

See Big Loss

Another analysis of the steel market by Townsend-Greenspan & Co., economic researchers, New York, indicates that first quarter steel consumption is only slightly under fourth quarter of 1953. At the same time ingot production has declined sharply.

They say that finished steel inventories have been declining at a rate of 500,000 to 800,000 tons a month since the beginning of the year—the equivalent of 7 to 10 points in the steel ingot rate. This is contrasted with an inventory buildup at the rate of 300,000 to 400,000 tons in the first half of 1953. They conclude that this shift in inventory policy has been costing steel mills a million tons of finished steel business per month.

Finally, they conclude if consumption continues anywhere near its present rate, production shouldn't drop much below current levels, should later improve, but no big pickup is predicted.

Follows Iron Age Forecast

Current steel market studies just released confirm a prediction by THE IRON AGE 3 weeks ago that "an upturn in steel business is still expected."

The exhaustive check of steel market conditions and outlook was undertaken by THE IRON AGE as soon as the decline in operations started early this month.

Results were published in a Special Report (Mar. 11, p. 75.) Other conclusions drawn by THE IRON AGE included:

(1) Drop in ingot rate was caused by postponement of expected pickup.

(2) Mills grossly underestimated consumer inventories. Inventory correction may continue for months.

(3) Mills themselves have heavy inventories of ingots and semi-finished steel.

(4) Rate of new orders is increasing, but individual order size is small and tonnage gain slight.

New Orders:

Buying, output top cutbacks first time since May '53

Industrial production and order increases in March outbalance decreases for the first time since last May, according to the National Assn. of Purchasing Agents report last week

The change of trend is marginal and, possibly, seasonal for production, with 24 pct up and 18 pct down. It is stronger on new orders, with 31 pct up and 17 pct down. As would be expected, the individual changes are not large, and the reversal of trend not strong enough to indicate a sharp upswing.

But it is apparent from the group's March survey that the industrial business decline has abated and is leveling out. Prices are showing some strength, particularly in the nonferrous metals. Unworked material inventories are down again. Employment is showing some betterment, as 68 pct report it holding steady at last month's levels.

Comments from producers of excise-taxed items indicate that considerable business is being held back awaiting final tax legislation.

Competition Is Keen

As to the future, the large majority of purchasing executives take a short-range view, expect that second quarter activity will be higher than in the first quarter. A few can see good business through the third quarter and a few more are optimistic for the whole year. The longer predictions

When "Normal" Buying Will Resume

(Answers Expressed in Pct of Total)

Production Workers	Days Unknown	30 Days	60 Days	90 Days	120 Days	180 Days or More
Eastern U. S.						
0–19	....	22	33	45	....	....
20–49	43	21	21	7	7	....
50–99	....	22	45	22	11	....
100 and Over	8	8	46	15	8	15
Total	16	18	36	20	7	4
Middle West						
0–19	13	13	37	37	....	....
20–49	15	15	44	19	7	....
50–99	....	15	46	31	8	....
100 and over	5	9	50	32	5	....
Total	9	13	46	27	6	....
Total Survey Area						
0–19	5	16	37	42	....	....
20–49	22	24	33	13	7	....
50–99	....	17	43	30	9	....
100 and over	5	8	49	27	5	5
Total	11	15	41	26	6	2

are hedged with too many "ifs" to make any clear pattern.

While industrial materials markets record many small, scattered declines in commodity prices, there were fewer of them and the general price structure made its first show of strength this year. Nonferrous metals led this slight upward movement.

Competition is very keen. Salesmen are following up inquiries very closely. A large increase in open quotations is reported, indicating a broadening of the shopping policy of many buyers. No sharp price movement, either way, is looked for in the immediate future.

Buy Small Quantities

Inventories are reported lower by 44 pct of the purchasing agents. This compares with 51 pct so indicating in February. While there is no tendency to build up inventories, the highest number since last November (45 pct), shows no change in stocks, confirming the February report that adjustments of unworked materials to current requirements have been completed in many companies. Quick availability and increased competition are restraining inventories.

Commitments remain predominantly in the mid-range of "hand-to-mouth" to 90 days. Reversal of the boom time escalator pricing is beginning to appear in offers of protection against price declines to attract continuing volume purchases. For the most part, purchasing departments are buying in the smallest economical quantities and placing orders more frequently.

—Manufacturing—

Safes:

Reports safemaking ahead of '53 . . . Alarm circuits tricky.

Paperwork is at least creating a healthy market for fireproof safes.

President Rudolph Hermann of Hermann Safe Co., San Francisco, in announcing the ground-breaking for a new $500,000-plant, said business is ahead of last year's by a good margin and should easily top 1953's $1 million.

DOOR, 4-in. thick, is for bank vault.

Major market is protection of records—more valuable than money these days. In destruction by fire, tax and insurance penalties are high in cases of no protection. And settlements are long since purchase and sales investigations are exhaustive.

Fill With Concrete

New plant's products will be custom-built welded 1020 steel plate with concrete fillers. Plant entrance will be large enough for concrete trucks which will pour cement between safe walls.

Safe sides are generally embedded in walls. Forged doors are case-hardened after drilling and tapping.

Largest recent job was an addition to the California State Treasurer's vault. Measuring 50 x 25 x 9 ft, it used 155 tons of steel.

Newest sideline is in curb-service tellers' cages which use C1095 carbon steel plate bandit barriers. More widely used for springs, saws and such, this ⅛-in. tool steel has the bullet-stopping strength of ½-in. plate.

Thieves will find little difficulty in starting the bell clanging on Hermann's latest models. Alarm circuit is closed by contacts if the dial is turned, by thermostat if heat is applied, by internal microphone if hammering is started.

Emphasize Heat Resistance

Heat dissipating copper sheets sandwiched between steel plates foil cutting torches. A secondary lock snaps shut if the first one is sprung. Internal security is solved in some units requiring three people to open. Biggest emphasis is on heat resistance since safecracking penalties on use of explosives are far heavier than other methods.

Are they tough? Insurance testing for a "4-hour safe" involves 4 hours exposure to 2000°F, a drop of 30 ft and another hour at 1700°F —with no damage to contents.

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Snap-on* Ferret Wrenches

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Here is one of the most adaptable, time-saving wrench kits you can put in the hands of maintenance or production workers—a complete set of Snap-on's famed Ferret wrenches. The set includes all handles (⅜″ square drive), adaptors, extensions and sockets (¼″ to ¾″), to speed a wide range of jobs. Handles are long, slim, strong, with patented "Palm-Grip" for real working comfort. 4-way socket grip for quickest handle hook-up. Available through your nearby Snap-on factory branch. Write for Snap-on Industrial catalog and general catalog of 4000 hand and bench tools.

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*Snap-on is the trademark of Snap-on Tools Corporation.

—Economy—

Business:

Government economists are optimistic over 1954 outlook.

An undertone of confidence is evident in the latest assay of current business by U. S. Office of Business Economics.

There's no doubt about it, the "gradual easing" in business activity which started in late 1953 has carried over into early 1954. This is most evident in hard goods distribution.

But the most obvious soft spot is inventories which continue to be liquidated.

Squeezing-out of manufacturing inventories, plus a decline in defense production, has provided the chief reason for a rise in unemployment to 3.7 million.

Signs Of Strength

On the other hand, OBE analysts see numerous bright spots in business developments since the turn of the year. Among them:

Prices remain firm, show no sign of sharp break;

Disposable income is less than 1953 rate but still higher than two years ago;

Industry still plans capital investment at about 1953 level;

Construction activity likely to set a new record.

What then is the immediate outlook? Here's the fine print:

Continued decline in federal procurement is largely in the defense field. But it is presently being offset to a great extent by stepped-up state and local expenditures.

Led by the steel and automotive industries, overall durable goods factory sales are seen at 8 to 10 pct below last year's dollar volume. Since the 1954 rate so far is just that, no further decline is expected.

Again reading between lines, since durable goods came up in 1953 with a busines gain of 14 pct above 1952, then 1954 volume is indicated at nearly 5 pct above 1952.

In spite of rising unemployment, personal income level stands at $282 billion rate, down from mid-1953 peak but still higher than a year ago.

EUROPE: Upturn In Steel Market

Two-year buyer's market has come to an end . . . Stocks have reached pre-Korea lows . . . Iron Curtain orders show heavy gains . . . Facts bear out predictions of bullish future.

The long decline of prices and buying in Europe's steel markets is about over. Speculation after the outbreak of the Korean war in 1950-51 caused heavy stockpiling in nations of the European Steel & Coal Community. These overstocked markets have finally adjusted and last month passed the dead center point in the demand-supply balance.

A look at steel production figures and the order backlog tells the story: Backlog at the end of June 1952 stood at 17,789,000 tons, by June 1953 it had sunk to 8,931,936 metric tons. Low point was reached in January 1954 with an order backlog of 3,324,700 tons.

Production of finished steel in excess of orders in 1952 was 3.5 million metric tons; in 1953 2.1 metric tons. Estimates for first quarter 1954 indicate that the situation will be reversed with new orders exceeding output by 370,000 metric tons.

Stocks Depleted

Supplies of coal, coke and ore are on the increase, while stocks of pig iron, steel and finished material are down. Stocks at the end of March were 1,320,000 tons representing a drop of 60 pct since January. In the East-West trading city of Tangier, last month's steel stocks of 21,000 metric tons were lower than June 1950 by some 2000 tons. High point at Tangier was 117,000 metric tons in June 1952.

Experts at ESCC headquarters in Luxemburg feel that after 2 years of buying less than has been consumed Europe's on-hand supply of steel neared a dangerous low last February. Consumption for the first quarter is running higher than previous estimates.

Prices too have tumbled just about as far as they can. Steel bars quoted by ESCC at current rates of exchange were $97 per metric ton in Germany and $91 in Belgium and Luxemburg, sold last week at $71-75 per metric ton f.o.b. mill. Steel producers are ready to close the mills rather than go any lower, and the buyers know it.

However, signs of an upswing have been noted in the last 2 weeks and at the moment orders are estimated above consumption level.

Producers Are Cautious

Market upturn is being influenced by a sharp increase of orders from the East—China and Russia. Last year these communist countries stood 11th on the Saar's list of customers. In the first quarter of '54 they have become the leading buyers. Last year Germany itself combined with Great Britain to take the major portion of the Basin's output.

THE IRON AGE learned that producers in ESCC countries intend to follow a "wait and see" policy and hold production to the figures established in 1954's first quarter. No marked upward readjustment of prices is anticipated.

Some producers have advised their customers that shipping times will be increased. These had been reduced to an "immediate ex stock" basis with delivery 3-4 weeks after orders are placed. Now steelmakers plan to stretch the period to 4-6 weeks. The new shipment times are being quoted by producers who could easily ship sooner.

Psychological effect on buyers however was timed neatly to boost the swing back to a mild sellers' market.

Marketing

C. M. White: "We've got to meet this thing head on. . . ."

Steel:

Republic's C. M. White stresses need to trim inventories.

"We have made up our minds that we have got to spend more money to put steel into new forms. We're going to double what we had planned to spend this year."

With one sentence Republic Steel President Charles M. White answered the economic gloomsters.

Speaking before a gathering of Cleveland businessmen last week Mr. White also took direct aim on the current inventory adjustment.

"We've got to meet this thing head on. The only possible way as I see it is to get operations in line with current demand. That will mean laying off people and it may be a little hard on stockholders, too. But once we get these inventories liquidated I don't believe anyone will get hurt."

Mr. White told THE IRON AGE he felt it would be almost impossible for anyone to say just when total inventory balance would be effected but he indicated that changes in wire products were pointing the way. He told his Cleveland audience Republic entered its own "recession or whatever you want to call it" last June when rate of incoming orders began a 4-month decline. Since October, however, according to Mr. White, Republic's monthly rate of incoming orders has balanced operating rate.

While referring to the present status of consumer inventories Mr. White said many metalworkers from primary producers to parts suppliers still had "barrels of steel."

Operating over unpaved ground, this TOWMOTOR stacks high, reduces size of storage area for leading manufacturer of concrete pipe.

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Sale:

Treasury Dept. to auction off $16 million Czech steel mill.

The Treasury Dept. has decided to sell the Czech-owned steel mill that has been languishing in this country since its export was blocked in 1952.

Sealed bids, which may be submitted by either domestic or acceptable foreign interests, will be opened in Washington on April 28 by the designate, Laurence B. Robbins. Mr. Robbins is special assistant to Treasury Secretary George M. Humphrey.

The government reserves the right to accept or reject any bid received on the property, for which Czechs paid about $16 million. Export of the mill to Czechoslovakia was prohibited by a Treasury Dept. order of January, 1952, per Export Control Law.

This blocking action was taken to insure that the mill would not be used for purposes inimical to U. S. interests.

Weigh Czech Claims

Purpose of the current sales effort is to have payments deposited in this country, where they would remain while the government weighs U. S. claims against Czechoslovakia. The Czechs have attempted to sell the mill on their own terms allowing no funds to get to U. S. Government—but these tries have been blocked.

Mill components, designed to roll and process steel, and built by United Engineering & Foundry Co., Pittsburgh, may be inspected at Philadelphia and New Castle, Pa.; Troy, N. Y., and Youngstown, Ohio.

Several years storage charges, unpaid by the Czechs, will have to be paid by the successful bidder.

A 66-in. 10-stand continuous hot strip mill with flying shear and a 64-in. 4-stand tandem cold strip mill are two important components of the equipment. Also included are a 4-high single stand skin pass mill for sheet stock in coils, a 4-high single stand skin pass mill for tin plate, a 4-high cold sheet mill, some electrical equipment for a 46-in. blooming mill, and related items.

DMS: Changes Unsnarl Red Tape

Long-delayed simplification of Defense Materials System effective Apr. 1 . . . Paperwork reduced for all but a few . . . Retains framework of controls if emergency develops.

Business & Defense Services Administration has scheduled its long-delayed simplification of its Defense Materials System. It will become effective on Apr. 1.

Actual changes in DMS are few. In effect, the DMS control framework remains intact but a substantial portion of those concerned with supplying or working from allocated materials are removed from under controls and reporting requirements.

Make Fewer Reports

More specifically, only the prime contractor and his principal subcontractors are subject to allocation controls and reporting requirements.

Prior to the modification, the prime contractor received his allotment of defense materials. Approximately 50 pct of his allotment authority was passed on to his principal subcontractors, who in turn passed on rating authority to the miscellaneous and small parts makers or suppliers.

All were required to keep records and make reports. In the case of a manufacturer of airframes, the number of firms involved amounted to 268. Under the modified DMS, the figure is 6.

Can Bypass Rating

Here's how it works: The principal subcontractor gets his allocation authority from his prime contractor and issues a rating number on to his parts suppliers who can use it or ignore it.

Since most types of steel, copper and aluminum are in good supply, most parts suppliers have been passing up the use of self-certification authority in order to stay away from getting wound up in red tape, keeping records, and making reports.

As it now stands, if a parts maker finds certain materials hard to get, he can use the rating number to obtain what he needs. But he won't have to keep records or make reports.

Chiseling Won't Hurt

Even though a parts manufacturer should choose to chisel a little, officials say, in view of the good supply of most materials it won't matter much. Less than 8 pct of rated materials are used by such suppliers.

The revised DMS is being put in effect after considerable consultation with industry represenatives, officials explain.

BDSA faced the alternatives of (A) keeping the former DMS in effect which would have been pointless since there are no shortages except in spots or (B) throwing out DMS in favor of straight priorities, which have never worked very well at any time.

As it stands, BDSA has reduced the paperwork for all but a few contractors but at the same time it still retains the framework of a control system if new emergencies should develop.

Expand Defense Order Screening

Military buyers and Small Business Administration specialists from now on will screen jointly those defense procurements valued at $10,000 or more to determine whether small firms can handle them satisfactorily.

This arrangement represents a change in the Defense Dept.-SBA screening program. Formerly, only procurements amounting to at least $25,000 were examined in this manner.

SBA expects that lowering the minimum value of orders examined will mean a much greater number of joint determinations and, as a result, the probability of a bigger share of contracts for small companies.

IRON & STEEL: February Output By Districts

As Reported to the American Iron and Steel Institute

BLAST FURNACE —NET TONS DISTRICTS	Annual Capacity	PIG IRON Feb.	PIG IRON Year to Date	FERROMANG. & SPIEGEL Feb.	FERROMANG. & SPIEGEL Year to Date	TOTAL Feb.	TOTAL Year to Date	Pct of Capacity Feb.	Pct of Capacity Year to Date
Eastern	17,261,850	1,055,526	2,270,364	18,252	35,224	1,073,778	2,305,588	81.1	82.6
Pitts.-Yngstn.	29,501,270	1,608,339	3,484,789	19,321	38,570	1,627,660	3,523,359	71.9	73.9
Cleve.-Detroit	8,714,680	442,654	1,030,580	.....	.....	442,654	1,030,580	66.2	73.1
Chicago	16,371,250	1,037,188	2,203,816	.....	.....	1,037,188	2,203,816	82.6	83.3
Southern	6,273,080	409,410	855,518	8,368	20,523	417,778	876,041	86.8	86.4
Western	3,879,260	211,496	450,683	.....	.....	211,496	450,683	71.1	71.9
TOTAL	82,001,390	4,764,613	10,295,750	45,941	94,317	4,810,554	10,390,067	76.5	78.4

STEEL —NET TONS DISTRICTS	Annual Capacity	TOTAL STEEL* Feb.	TOTAL STEEL* Year to Date	TOTAL STEEL* Pct of Capacity Feb.	TOTAL STEEL* Pct of Capacity Year to Date	TOTAL STEEL* Index** Feb.	TOTAL STEEL* Index** Year to Date	ALLOY STEEL Feb.	ALLOY STEEL Year to Date
Eastern	25,864,060	1,471,574	3,056,388	74.2	73.1	117.5	115.8	78,037	165,009
Pitts.-Yngstn.	44,348,060	2,508,451	5,328,795	73.7	74.3	98.0	98.8	341,450	706,483
Cleve.-Detroit	12,791,780	632,543	1,468,830	64.5	71.0	114.5	126.2	42,613	91,616
Chicago	27,371,700	1,844,549	3,409,543	78.3	77.0	117.0	115.1	91,720	184,070
Southern	6,932,340	423,792	924,124	79.7	82.5	134.6	139.3	6,489	11,201
Western	7,022,470	402,328	847,043	74.7	74.6	118.4	118.3	7,340	13,548
TOTAL	124,330,410	7,083,237	15,034,723	74.3	74.8	110.2	111.0	567,649	1,171,927

* Includes Alloy Steel.
** Index of production based on average annual production of the years 1947, 1948 and 1949.

Contracts Reported Last Week

Including description, quantity dollar values, contractor and address. Italics indicate small business representatives.

Hydraulic surface grinder, 45 ea, $493,-875, C. H. Gosiger Machine Co., Dayton, Ohio.

Cleaner, vacuum, 276 ea, $58,484, The Spencer Turbine Co., Hartford, Conn.

Laundry washing machine, 52, $197,422, AA Laundry Machinery Co., Chicago, Ill.

Distillate pumps, 90, $88,526, Buffalo Pumps, Inc., Washington, D. C.

Horizontal distiller pump, 68, $68,656, Walter H. Eagan Co., Inc., Phila., Pa.

Kits, aero 14B rocket launcher, 15000, $701,250, Engineering and Research Corp., Riverdale, Md.

Kits of parts (V&VI) for addition of armor plate on model AD-2 aircraft, 162, $224,358, Douglas Aircraft Co., Inc., El Segundo, California, *W. H. Hough.*

Launcher, rocket, disposal, 4590 ea, $178,960, Universal Moulded Products Corp., Bristol, Va.

Stand test, hydraulic system parts, 409, $1,440,522, Sun Electric Corp., Chicago, Ill.

Fuze, bomb, 200000 ea, $196,500, Barley-Earhart Corp., Portland, Michigan.

Fuze, bomb, 83000 ea, $57,062, Bayshore Industries, Inc., Elkton, Maryland.

Projectiles, 180000, $2,785,089, U. S. Hoffman Machinery Corp., New York.

Spare parts for materials handling equipment, $69,753, Clark Equipment Co., Jackson, Mich.

Wheel assy, solid tail, 2359 ea, $58,857, Aerod Company, Inc., Los Angeles, Calif.

Cylinder assy, inner cylinder and 201 items of shock strut parts, Var, $654,836, Bendix Aviation Corp., Bendix Products Division, South Bend, Ind., *G. I. Lyman.*

Carburetor assy, 333 ea, $353,780, Bendix Products Div., Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman.*

Hoist, bomb aero 14B and cable assy, Var, $61,401, Manley Div., American Chain & Cable Co., Inc., York, Pa., *W. E. Speck.*

Wrench, impact, pneumatic, 725 ea, $69,-564, Ingersoll-Rand Co., Phila., Pa.

Shock strut & maintenance parts for UF-1 aircraft, Var, $72,941, Bendix Products Div. Bendix Aviation Corp., South Bend., Ind., *G. I. Lyman.*

Amplifier and spare parts, Var, $121,198, Eclipse Pioneer Div., Bendix Aviation Corp., Teterboro, N. J., *F. A. Battel.*

Maintenance parts for use on various aircraft, Var, $363,025, The M. B. Mfg., Co., New Haven, Conn.

Switch, Var, $84,876, Airite Products, Inc., Los Angeles, Calif.

Carburetor assy, Var, $113,715, Bendix Products Div. Bendix Aviation Corp., South Bend, Ind., *G. I. Lyman.*

Bearings, Var, $115,427, General Electric Co., Phila., Pa.

Maintenance parts for various aircraft engines, Var, $148,526, Scintilla Div., Bendix Aviation Corp., Sidney, New York, *A. W. Dietrich.*

Control, including spare parts, 187 ea, $84,886, The Bristol Company Aircraft Equipment Div. Waterbury, Conn.

Valve assy, 2000 ea, $90,000, Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn.

Parts for P & W engines, Var, $431,158, United Aircraft Corp., Pratt & Whitney Aircraft Corp., Windsor Locks, Conn.

Shell, HE, M49A2 MPTS 60 MM mortar, 275000, $338,250, Murray Mfg. Corp., Brooklyn, N. Y.

Breech block halves for 127 MM AA gun T-134E2, 2, $149,855, American Machine & Foundry, New York, N. Y.

Fans and scrubbers, lot, $106,900, Clermont Engineering Co., Phila., Pa.

Kitchen range, electric domestic, 1871 ea, $170,107, Weibilt Stove Co., Inc., L. I. New York.

Projectile, TP, 20 MM 2862500 ea, $598,-262, Harvey Machine Co., Inc., Torrance, California.

Mine, land, chemical, 200000 ea, $93,899, Eastern Can Company, Brooklyn, N. Y.

Drill, twist, 661917 ea, $86,686, Whitman & Barnes, Div., United Drill & Tool Company, Plymouth, Mich.

Telephone, sound powered, 5000 ea, $216,300, Telephonics Corp., L. I., New York.

Rocket launchers, 17 ea, $2,190,667, Pennsylvania Transformer Co., Canonsburg, Pa.

Torpedo warheads, 3250 ea, $745,940, American Mach. & Foundry Co., New York.

Dummy nose fuzes, 442000 ea, $149,396, The Lamson & Sessions Co., Cleveland, Ohio.

Remote flight control systems, 32 ea, $2,560,203, Sperry Gyroscope Co. Div. Sperry Corp., Great Neck, N. Y., *George A. Dennis.*

Gears, 5, $71,923, Commercial Engineering, Washington, D. C.

Rotor, turbine propulsion, 2, $76,980, General Electric Co., Washington, D. C.

Nozzle diaphragm, 16, $51,635, General Electric Co., Washington, D. C.

Propulsion diesel engine, 36, $1,681,560, Packard Motor Car Co., Detroit, Mich.

Pumps, 6, $68,648, Warren Steam Pump Co., Inc., Warren, Mass.

Main feed pump complete with turbine drive and controls, 14, $757,254, Byron Jackson Co., Los Angeles, Calif.

Main boilers, 8, $2,230,402, The Babcock & Wilcox Co., New York.

Inspection

X-Ray:

Does good job of inspecting irregularly shaped parts.

Inspection of irregularly-shaped jet engine parts is speeded at Solar Aircraft Co.'s Des Moines plant by an X-ray technique borrowed from medicine.

Originally perfected to immobilize patients undergoing diagnostic or therapeutic treatment, the technique uses a thin-walled rubber bag, filled with fine plastic granules and equipped with a portable electric vacuum pump. Normally the bag is limp. When air is partially evacuated from the bag, it becomes pliable like putty, and can be easily molded to any desired shape. Finally, when air is further exhausted, the bag and its contents become extremely rigid, holding any previously molded shape. Called Flexi Cast, the device was developed by Picker X-ray Corp.

Since the device "freezes" into the desired shape when air is removed, it can be made to serve as a universal jig and fixture. In most cases the bag, once formed, will serve for X-ray inspection of any number of like parts. In addition to holding the part, the bag also serves to hold the X-ray film firmly in place during exposure. Since the bag and its contents are transparent to X-rays, radiography is easily performed.

In use at Solar, this special equipment has tripled inspection output on certain parts requiring X-ray examination. At the same time it has almost eliminated the need to build special jigs or supports for holding the parts during X-ray or to support the film during exposure. It is in regular use at Solar's Des Moines plant in X-raying experimental jobs and for production X-raying where the lengths of runs do not justify other types of jigging.

OPERATOR checks X-ray inspection setup for irregular parts.

BAG filled with plastic granules is formed to serve as jig for part.

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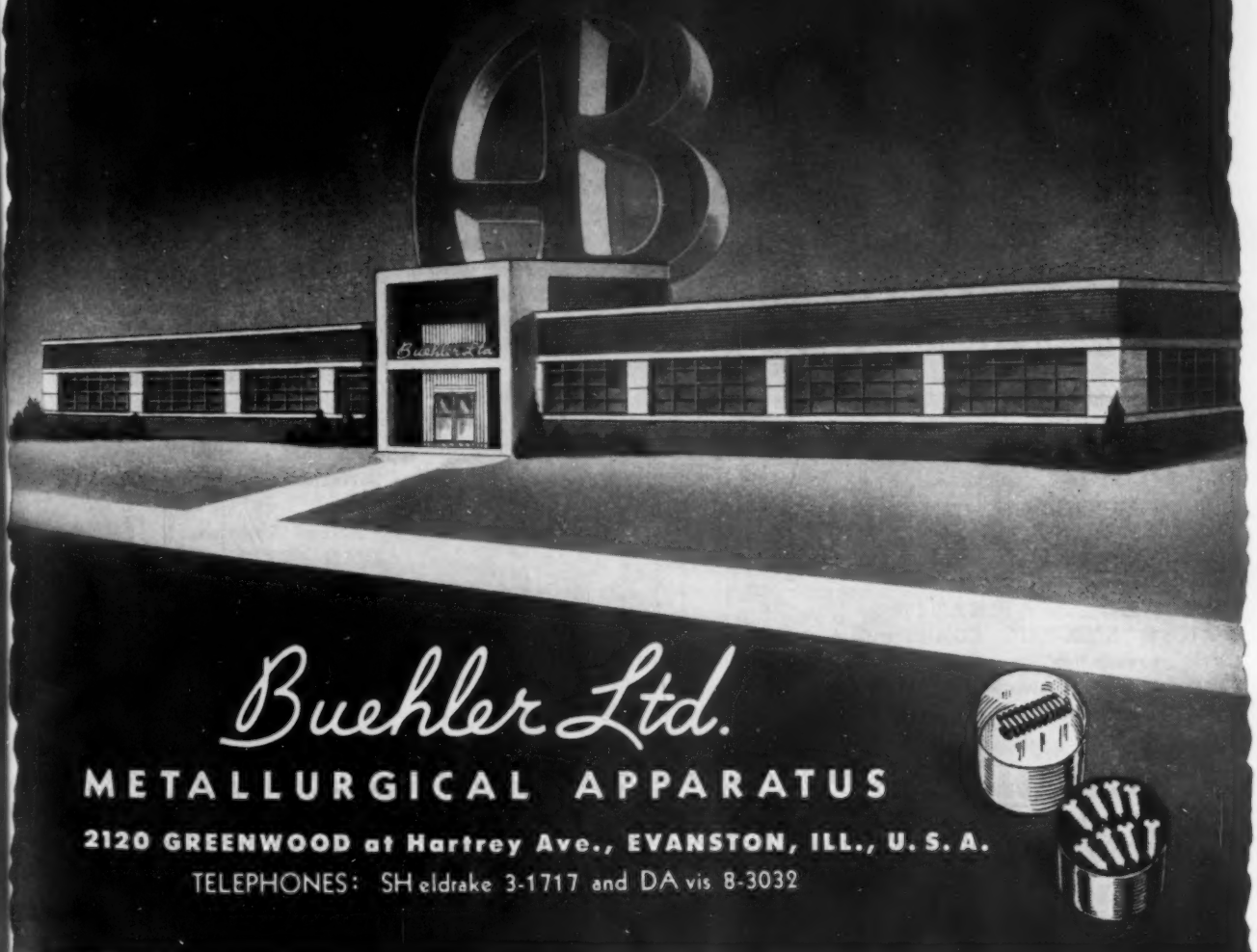
These facilities have been arranged so that we can provide better equipment and better service for our customers. Changing your records now to show our new address may prevent annoying delays on future correspondence and orders.

We are delighted with the new building and location and will be pleased if you will take the next opportunity to visit us. A display will be available of our complete line of metallurgical sample preparation equipment, optical instruments for the laboratory, Amsler and Chevenard testing machines and other items.



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Industrial Briefs

Ahead of Time . . . PITTSBURGH STEEL CO. shipped the first sheet steel from its new cold-rolled sheet mill at Allenport, Pa., ahead of schedule, to Chrysler Corp., Detroit.

Highly Honored . . . Edgar H. Dix, Jr., assistant director of research for ALUMINUM CO. OF AMERICA, was honored in Kansas City by the National Assn. of Corrosion Engineers. He received the Frank Newman Speller Award given annually for high achievement in corrosion engineering.

Navy Contract . . . INGALLS SHIPBUILDING CORP., Birmingham, has been awarded a Navy contract to build two more landing ship docks.

Addition . . . AIR REDUCTION SALES CO. has added a new gas producing unit at its Birmingham plant to increase its production of oxygen and nitrogen.

Gets Contract . . . TEMCO AIRCRAFT CORP., Dallas, has been awarded a multi-million-dollar contract by Boeing Airplane Co., Wichita Div., calling for the tooling and production of two major components of the B-52 Stratofortress.

Outside Limits . . . BROWN & SHARPE MFG. CO., Providence, has moved its Philadelphia office just outside the city limits to 7 Bala Ave., Bala-Cynwyd, Pa.

Third Furnace . . . GRANITE CITY STEEL CO. put a third open hearth furnace in operation last week.

Elbow Room . . . LURIA BROTHERS & CO., INC. moved its New York executive offices to larger quarters at 99 Park Ave. where they will occupy the entire 21st floor.

Metals Plant . . . WESTINGHOUSE ELECTRIC CORP. will break ground next month for construction of its new multi-million-dollar metals plant at Blairsville, Pa.

Named Dealer . . . CLARK EQUIPMENT CO. appointed the Michigan Machinery & Equipt. Co., St. Joseph, Mich., as its Western Michigan distributor for Clark's Construction Machinery Div., handling power shovels and Michigan tractor-shovels.

Breaks Ground . . . AMERICAN CAN CO. has started construction on its new 60,000 sq-ft plant in Denver.

Dividend . . . RELIANCE ELECTRIC & ENGINEERING CO., Cleveland, declared a dividend of 50¢ a share on its common stock.

Complete Line . . . AMERICAN CHAIN & CABLE CO's R-P&C Valve Div. has announced the complete line of bronze valves equipped with CORADUR stems, a new metallurgical development said to solve the old bugaboos of corrosion and dezincification.

Exclusive Basis . . . WHITNEY CHAIN CO.'s Hanson-Whitney Div. appointed Macaulay Machinery Co., Inc. as exclusive sales representative for the Hanson-Whitney line of machine tools in northern New York.

Time Flies . . . Over 18 pct of SERVEL, INC. employees have been on the company's payroll for 20 years or more.

Moves In . . . TENNEY ENGINEERING, INC. is now carrying on full scale operations in its new plant at 1090 Springfield Road, Union, N. J.

Refresher Course . . . ILLINOIS INSTITUTE OF TECHNOLOGY, Chicago, will offer a 2-week refresher course in Basic Oil Hydraulics for the first time this summer, from June 7-18.

Going Up . . . TOWNSEND CO. has started clearing land in Ellwood City, Pa., in preparation for construction of a new factory.

"See if you can calm the old man down. He's sputtering like a machine gun."

Touring Caravan . . . The Yale & Towne Mfg. Co.'s Yale Materials Handling Div. reports that its Yale Road Show, a travelling materials handling show, has rounded out 25,000 miles covering 30 states in its first year on the road.

Hear Ye . . . The 1954 PACIFIC NORTHWEST METALS & MINERALS CONFERENCE will be held at Multnomah Hotel, Portland, Ore., Apr. 29-May 1. Welcome mat is out to all metallurgists interested in attending.

Dealer . . . Research & Control Instruments Div. of NORTH AMERICAN PHILIPS CO., INC., has appointed W. A. Schueter a dealer in the Southwest for products of the division. The new organization will be known as the Southwestern Electronics Corp.

Purchased . . . THE WARNER & SWASEY CO., Cleveland, has purchased the business and assets of Industrial Scientific Co., New York, and has formed The Warner & Swasey Research Corp.

Traveling Exhibit . . . THE HARNISCHFEGER CORP., Milwaukee, will display and demonstrate what they claim is a revolutionary new line of P&H welding machines through means of a traveling exhibit which will visit 18 major cities.

Sold . . . Steamers *General Orlando M. Poe*, and *Samuel F. B. Morse*, the last two of five boats put up for sale by the Pittsburgh Steamship Div., U. S. STEEL CORP., Cleveland, have been sold to the Wyandotte Transportation Co., Wyandotte, Mich.

Second Addition . . . THE GUARDIAN STEEL CORP., Detroit, has completed the second addition to its building. The new addition of 7000 sq ft brings the total area to approximately 50,000 sq ft for the overall plant.

Safe Production . . . JONES & LAUGHLIN STEEL CORP., Vesta-Shannopin Coal Div., set a new record for the safe production of coal in 1953. Final figures show that the division produced 4,948,017 tons and that its 3640 employees worked 6,682,800 man-hours with but one fatality.

Make it **WEIGH LESS** and **LAST LONGER** with

N-A-X
HIGH-TENSILE STEEL

You can design light weight, longer life, and economy into your products by including N-A-X HIGH-TENSILE in your plans.

- It is 50% stronger than mild steel.
- It is considerably more resistant to corrosion.
- It has greater paint adhesion with less undercoat corrosion.
- It has high fatigue life with great toughness.
- It has greater resistance to abrasion or wear.
- It is readily and easily welded by any process.
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And with all these physical advantages over mild carbon steel—it can be cold formed as readily into the most difficult shaped stamping.

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NATIONAL STEEL CORPORATION

Seek Economy in Standard Automation

Engine switches boom automation equipment business . . . Now attempt partial standardization . . . Mechanical handling of sheet steel for presses may be next—*By R. D. Raddant.*

It's a logical assumption that with automation in auto plants gaining by leaps and bounds, makers of automation equipment are reaping a golden harvest.

This is a specialized field that produces the equipment to handle the engine blocks, cylinder heads, crankshafts and other parts; shuttling, lifting, lowering, rotating or turning them between stations. It has more than tripled in size in the changeovers from old engines to the new V-8's that made mechanical handling an economic necessity.

It would be better to say that automation has matured, rather than grown, in this short period. Some of the devices that were the last word in 1952 are already being refined or replaced.

Set Up Standards . . . Now, automation has reached the station in life where an attempt is being made to standardize automation equipment to the point where it will become, as one authority put it, "a shelf item."

Complete standardization is probably out of the question. But, on the other hand, there is no reason why a turnabout, a shuttling device, a lift or block tilter couldn't be standardized to a degree. Then, without the necessity of special engineering of every feature, cost of construction and installation could be cut considerably.

Probably the leader in this field is the Wilson Automation Co., Detroit. The original company built jigs and fixtures (and still does), but organized a separate automation company when construction of the Ford Cleveland engine plant brought it into the automation business in earnest.

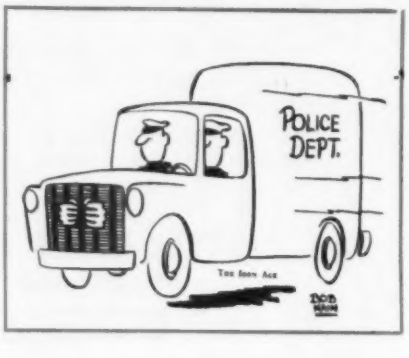
Spread Rapidly . . . The company's experience at Cleveland is a case history of the spreading of mechanical handling of engine parts. First only the cylinder block received complete automatic handling. Then it was extended to the cylinder head and finally to the crankshaft.

Wilson now has about 300 automation units in Ford's Cleveland plant and probably the same number at the new V-8 plant in Dearborn. Currently the Pontiac and Chevrolet engine programs are being completed and these also require hundreds of automaton devices.

In 1950 this one company employed about 25 men. Now it has almost twice that many, 45, in its engineering department alone.

But what will happen when the engine programs now under way are completed? With almost every company completely tooled up for V-8 production, will it leave automation companies with no new worlds to conquer?

Sheet Parts Next? . . . Probably the next big field where automatic handling can best be developed beyond its present limits is in the handling of steel sheets for presses. One series now under construction, for example, will take a Chevrolet hood through five presses without being touched by a human hand.



The field has also extended to special machines, where engineers are combining automation with special machining. One of these now under construction for a transmission maker will automatically assemble a bearing cap on a transmission case. It will place the cap, insert two bolts, and torque them automatically.

And, of course, the field is not limited to the auto industry, although it will always owe its start to Detroit. Appliances, electric motors, and many other manufactured parts that require lifting and handling, are all ripe for automation equipment.

Enter American Motors . . . The Nash-Kelvinator, Hudson merger went through like clockwork last week with better than 70 pct of stockholders of both corporations approving the consolidation.

As American Motors Corp., it will operate in three divisions; Nash Motors, Hudson and Kelvinator. George W. Mason, Nash-Kelvinator chairman and president, will continue in the same capacity in the new firm. A. E. Barit, Hudson president, will serve on the board and as "consultant."

Turn Page

Extend Lower Auto Rail Rate

Reduced rates on rail shipments of automobiles from Detroit to the East are to continue in effect. Interstate Commerce Commission last week approved continuance of seasonal rate reductions, but said it would not issue an order extending the reduction until the Federal District Court at Detroit has acted on a restraining order forbidding the ICC from extending the cut rates beyond 1953. Railroads want the lower rates in effect in order to meet boat-truck competition during the Great Lakes shipping season.

This indicates that Hudson will undergo a complete operating reorganization in an attempt to revitalize its status. Rumors can be heard to cover almost every possibility, including the moving of all car manufacturing to Nash's home plant at Kenosha, Wis.

It is unlikely, however, that both car making units will continue to operate entirely independently. Body and engine manufacturing will have to be reorganized to give both divisions the benefit of combined operations while other overlapping functions will have to be trimmed.

Union:

Hint shift from guaranteed "wage" to "employment."

By another name would the guaranteed annual wage seem the same?

Suppose, as the UAW (CIO) indicates it would prefer, it was called a "guaranteed employment plan" rather than the controversial tag of guaranteed annual wage.

Actually, this is an academic question. The issue, which is sure to come up at the expiration of the UAW's 5-year contracts with the auto companies, will be settled on provisions, not on its title. However, an attempt to place the emphasis on employment rather than pay has particular significance at this time.

Last week a UAW economist hinted at a complicated "reinsurance" provision as a feature of the demands it will make in '55. Presumably, the employer-automaker would be asked to make premium payments to the reinsurance agency, possibly matched by Federal contributions. Guaranteed wages would then come from the reinsurance agency in case of unemployment. These would be dovetailed with state and local unemployment benefits.

At the same time, the UAW implied it will insist on a joint union-management board, rather than a government agency, to administer any guaranteed annual wage program.

The complicated reinsurance feature was compared to President Eisenhower's proposal "with respect to reinsurance of hospital and medical insurance programs."

Detroit Notebook . . .

General Motors now has a record number of 495,575 owners of common and preferred shares. Nearly 70,000 have become shareholders since World War II while others have owned an interest in the company for more than 30 years.

In another company record, Ford employed an average of 185,020 persons in the U. S. during 1953 and paid them a record $987,840,519 in wages.

Plymouth added vacuum booster power brakes to its list of optional features on 1954 Plymouth cars. Factory retail price is $34 plus tax. All of Plymouth's new power features, including power brakes, power steering and PowerFlite transmission are in production.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
Mar. 27, 1954..	124,926*	24,172*
Mar. 20, 1954..	130,295	24,600
Mar. 28, 1953..	147,156	34,533
Mar. 21, 1953..	136,300	33,623

*Estimated. Source: *Ward's Reports*

In spite of the general gloom that prevailed over much of the industry so far this year, the first quarter was the third best in production for the first 3 months of any year. The 1,416,000-car total was 7 pct under 1953 and 12 pct under the all-time high rate of 1951.

New car registrations, which are slow to be compiled, also lag behind production in numbers as well as time. According to R. L. Polk and Co., Detroit statisticians, passenger car registrations were only 340,877 in January, but gained to 389,000 in February. This agency predicts a first quarter registration of over 1 million, compared with the much higher production.

THE BULL OF THE WOODS — By J. R. Williams

YEH, THIS IS TH' KIND OF COFFEE WITH TH' CAFFEIN TAKEN OUT-- WANT TO TRY IT?
THANKS, I USE TEA WITH BAGS! THEY TAKE THE LEAVES OUT!
GETTIN' WHAT'S IN OUT HAS BECOME A NATIONAL HABIT SINCE IT TOOK SO LONG TO GET THE DEMOCRATS OUT! THEY GOT CAFFEIN OUT, NICOTINE OUT, FAT OUT OF BEER, NOURISHMENT OUT OF FOOD, AN'--
THE TASTE OUT OF COOKIN'! THE--OH, I COULD GO ON!
TAKING WAYS
4-2 J.R.WILLIAMS
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portable grinding is profitable grinding with SIMONDS resinoid bonded grinding wheels

Spot grinding! Smoothing welds! Grinding in corners! Working with odd shapes! Wherever low-cost, top-operating efficiency is essential, Simonds portable wheels fill the bill. They cut fast, hold their shapes, give long service, and include everything you need—straight wheels, cup wheels, cones, pot-balls and blind-end wheels. Resinoid bonded for high speeds up to 9500 s.f.p.m. Write for free folder ESA-62.

Rotor type cup wheel—cross section shows steel bushing flange and safety ring.

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Ike Voices Confidence In U.S. Economy

Strategy for prosperity now clear . . . Spending power and buying incentives are the key . . . "Make-work" is out . . . Begin long-range dispersal study—By G. H. Baker.

President Eisenhower's strategy for long-pull prosperity is now clear: Boost spending power, rather than rely upon public works or government handout operations.

"Make-work" projects are out. The White House, despite reports, is not ready to spring an array of WPA-type projects. Instead, the Administration intends to rely upon positive and direct approaches to high-level consumer spending. Examples: Lower taxes for industry and consumers, easier credit, ready availability of money.

Bolster Buying Incentives . . . Tax reduction, more than any other spending stimulant, is the gimmick the Administration is counting on to hypo sales this year. Under the new tax law, industry will have stronger incentives to replace machinery and equipment, and to buy new machinery and equipment. And consumers, faced with substantial mark-downs in the prices of many mechanical appliances, have more incentive to replace or add to their household equipment.

President Eisenhower believes firmly in the U. S. economy's ability to thrive without the application of government palliatives. He stated last week that a slam-bang emergency federal program to cope with unemployment is not necessary at this time. He believes that badly-timed emergency action could well destroy the "buds" of the normal business upturn that are now in the making.

Study Decentralization . . . How far should industry go in undertaking the tremendous expense and far-reaching planning involved in moving plants out of "target areas.

The Federal Goverment has begun to look into this long-range question, and plans to come up with definite answers in the months ahead.

Clearly, some kind of financial incentives to industry—particularly heavy industry—are in order, the Office of Defense Mobilization believes. ODM executives see no reason why any company should be asked to bear the staggering expense involved in erecting new facilities in "bomb-proof" areas.

No Such Thing . . . Short of locating a plant in a carved-out rock formation, there is of course, no such thing as a "bomb-proof" area. This is a loose term used to designate relatively isolated areas far removed from the concentrated, built-up areas like Pittsburgh, Detroit, and Cleveland.

The steel industry has entered into detailed discussions with ODM on the dispersal program. Just what specific points are being outlined for the erection of duplicate facilities by different companies are not now disclosed. The basic goal is clear, however: To assure a continued flow of steel in time of enemy attack.

Won't Stock Scrap . . . There is no serious consideration being given by the Federal Government at this time to proposals that ferrous scrap be stockpiled.

In addition, no official enthusiasm is now seen for a suggestion that scrap be bought by a government agency, converted into pig by steel companies, and then stored for later use.

Official Washington view is that the purpose of stockpiling is to provide the country with a ready source of scarce materials for use in emergency times, and not to establish a current market for domestic supplies which now are overstocked.

Government believes sufficient scrap is generated so that there will always be a supply for industry whenever needed.

NEW LABOR TEAM gets a family portrait. Secretary J. P. Mitchell, seated, poses with top aides in Washington. Left to right; Assistant Secretaries H. C. Hobart, Arthur Larson, Rocco Siciliano and J. Ernest Wilkins. Extreme right, Administrative Assistant Secretary, James L. Dodson.

ONE CEMENT — FOR ALL YOUR REFRACTORY NEEDS

Reduce inventory . . . simplify purchasing with Armstrong's C199 Cement

Here's the air-setting refractory mortar that does all these jobs:

1. **Sets all types of fire clay brick**
2. **Bonds insulating refractories**
3. **Forms protective facing on brick furnace linings when applied with brush or spray.**

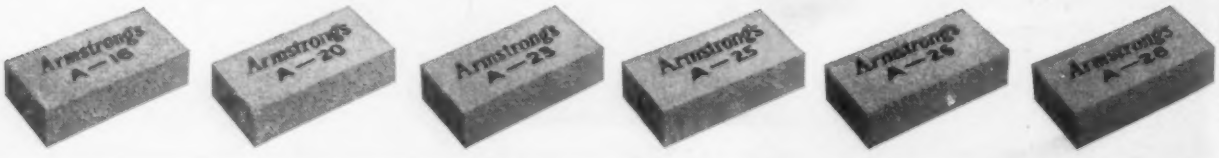
By standardizing on C199 Cement you can purchase in more economical quantities, forget inventory problems, and be sure of a strong, dependable job every time!

C199 is made of selected refractory clays and special bonding agents that will not soften and run out of brickwork joints. It takes a firm set at room temperature and maintains its high strength up to 2910° F. You'll find C199 offers important working advantages, too. It's easy to handle, can be used right from the drum, and has excellent plasticity.

You can get full information on C199 in the booklet, "Armstrong's Insulating Fire Brick and Refractory Cements." For your FREE copy, contact the Armstrong office nearest you or write Armstrong Cork Company, 2704 Susquehanna St., Lancaster, Pa.

SPREADS EASILY. Even after months of storage, C199 Cement is easy to work with. It pours readily and has enough moisture to spread well ahead of the mason. C199 also thins easily to dip joint consistency.

WILL NOT SOFTEN. C199 never runs out of a joint. It withstands abrasion, is highly resistant to slagging and spalling. This cement meets ASTM, American Refractories Institute, and Navy standards for a super-duty, 2910° F. mortar.



ARMSTRONG'S INSULATING REFRACTORIES

STANDBY PLANTS: Go Back to Military

GSA warns some aren't worth upkeep cost . . . Agency to turn over 13 by July 1, keep six . . . Original cost of 13 was $205 million . . . See costlier maintenance—By *A. K. Rannells.*

Congress and the Defense Dept. have been warned that some of the standby war plants which have been held in the industrial reserve since the war aren't worth cost of upkeep.

This is the opinion of General Services Administration, which is turning back to the military services 13 standby plants which bore an original cost tag of $205 million.

Transfer will be completed before July 1. Switch-over is being made in line with recommendations of the old Munitions Board and statutory authority of the Defense Dept. to ask it.

GSA Keeps Six

Old board believed it would be better if standby plants designed primarily to produce strictly war materials such as ammunitions, explosives, naval vessels, etc., were kept under control of the military. Theory was that they could be reactivated more quickly.

This leaves GSA riding herd on six standby plants which are designed to produce raw materials essential to war production such as magnesium and nickel, castings and forgings. Original cost of these six plants runs about $70 million.

Edmund F. Mansure, GSA administrator, is apparently glad enough to get rid of the responsibility for the 13 plants. It will reduce his operating budget next year by $1.6 million.

But the taxpayers get no break. It is estimated that under military housekeeping the maintenance cost will jump to about $2.7 million, or 70 pct more than under GSA.

"Have Reached the End"

Moreover, Mr. Mansure has reported to Congress, responsible authorities should "critically" examine each of the 19 properties. His own inspection convinces him that:

"While some are well preserved and can be maintained economically, others have many buildings and other facilities which, because of temporary construction and depreciation beyond scope of reasonable maintenance, have reached the end of useful life.

"A number of these plants have been so completely cannibalized as to make their retention in the reserve and their continued maintenance seriously questionable."

How many of the 19 plants can be roughly classified as worthless is not revealed. However, the ordnance plants at Point Pleasant, W. Va., and Rosemont, Minn., are cited as cases in point.

Acquisition cost of these properties amounted to about $10 million each. Using the GSA yardstick in figuring maintenance cost, they would be valued at less than $80,000 each.

List Plants

Plants to be turned back to the services before the end of June are:

Ordnance plants—Green River Works, Dixon, Ill.; Gopher Works, Rosemont, Minn.; Keystone Works, Meadville, Pa.; Oklahoma Works, Pryor, Okla.; Plum Brook Works, Sandusky, O.; Weldon Spring Works, Weldon Spring, Mo.; and West Virginia Works, Point Pleasant, W. Va.

Shipyards — Associated Shipbuilding & Drydock, Seattle; Charleston Shipyard, Charleston, S. C.; Chicago Bridge & Iron, Seneca, Ill.; Delta Shipyard, New Orleans; Wainwright Shipyard, Panama City, Fla.; and Western Pipe & Steel, San Pedro, Calif.

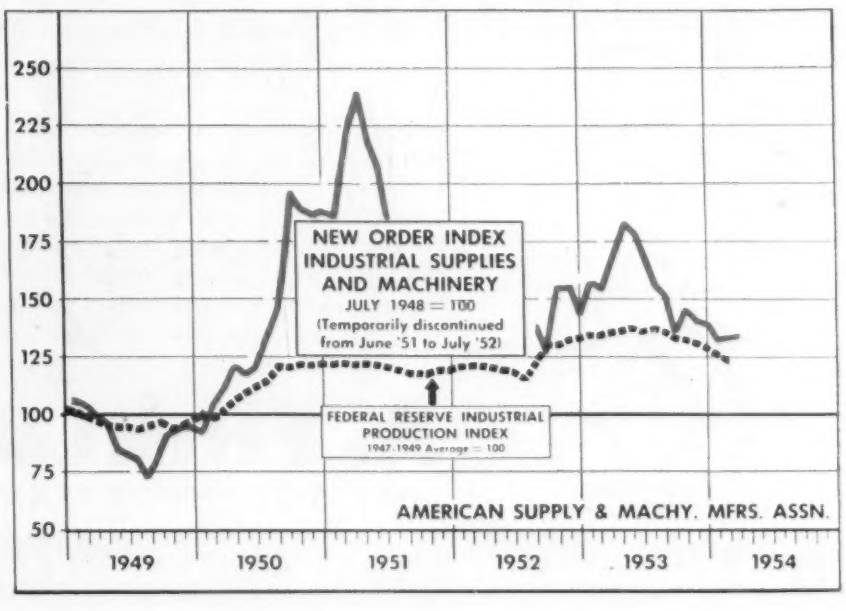
Meanwhile, GSA will retain under its supervision:

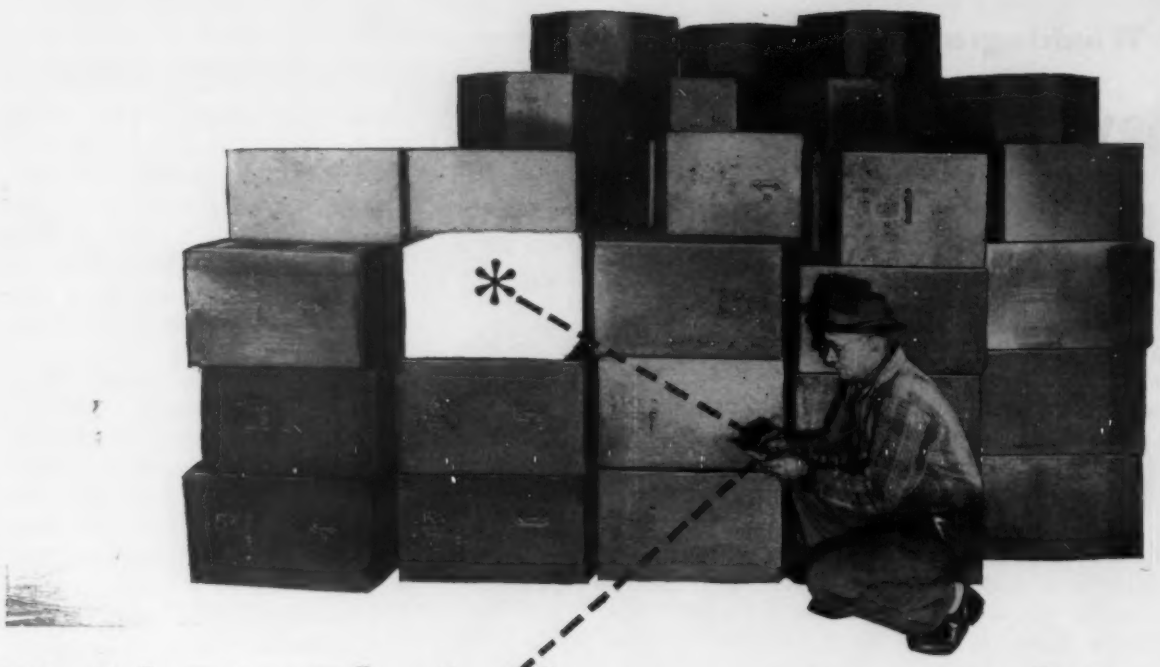
Amco Magnesium, Wingdale, N. Y.; Benjamin Franklin Graphite, Chester Springs, Pa.; Diamond Magnesium, Painesville, O.; Gary Armor Plate, Gary, Ind.; Electro-Metallurgical, Spokane; and Permanente Metals, Manteca, Calif.

Drops Uniform Freight Rates

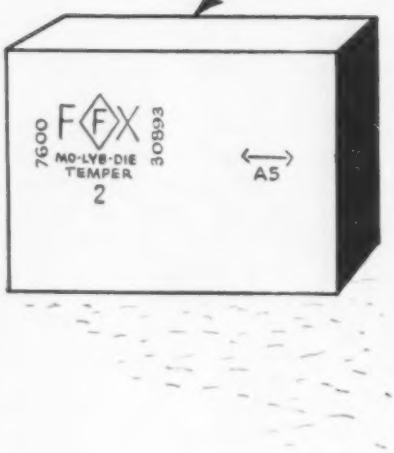
Reconstruction Finance Corp. is dropping its uniform freight charge policy in the case of GR-S Rubber for export shipments.

Effective with shipping orders to be issued for April, export orders will be shipped on an f.o.b. basis at the producing plant or warehouse. Most orders, however, are expected to be shipped from Gulf Coast plants or storage.





Finkl Die Blocks have your number



The entire history of a Finkl die block is hot stamped on its side. For instance, #7600 is the heat or melt number used to fill the order. #30893 is the production number. The FX and Diamond F is the trademark of the special steel used. Temper 2 signifies the hardness to which the block is heat treated. The arrow shows the direction flow of the metal as a guide for die sinking. The A5 under the arrow indicates the block location in the ingot runout.

All of this means that we process our forgings and die blocks according to the requirements of you, our customer, with a complete file checking each step from molten steel to finished product. It also means that when you receive a Finkl forging or die block it can be used with confidence. It will do your job and do it well. When you need quality and service specify Finkl forgings and die blocks.

For technical assistance or further information concerning your forging problems, call or write your nearest Finkl District Office.

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U.S. May Get Its First Monorail

Overhead monorail transportation system for Los Angeles may be approved . . . Would cost $165 million . . . Considering monorail for San Francisco also—*By T. M. Rohan.*

The long-discussed overhead monorail transportation system was a step nearer reality last week.

In Los Angeles where a $165 million system has received favorable recommendation from an independent engineering firm, legislative roadblocks to financing were being cleared. Subway tunneling is out of the question because of long distances involved and surface transportation involves cutting through long stretches of populated areas. Monorail costs are estimated at about $3.5 million per mile compared to $11 million per mile for subways.

In San Francisco, the monorail is still mostly in the talking stage although another survey is underway there. Other cities considering it are Detroit and Montreal.

$70 Million in Steel . . . The Los Angeles system—45.7 miles long—would be one of that city's major construction jobs. It would include nearly $70 million alone in steel construction plus 117 steel and aluminum cars at a total of $9.3 million.

Construction of the monorail system was recommended by Metropolitan Transit Authority following a year-long study by the New York engineering firm of Coverdale and Colpitts and has been referred to Gov. Goodwin Knight for state approval.

The Los Angeles monorail system would be first in the U. S. and would include 17 elevated stations equipped with escalators and pay turnstiles.

Only system now in operation is in Wuppertal, Germany, near Cologne, which has been running since 1901. The overhead rail line would be suspended from steel reinforced pillars stretching along the entire Long Beach to San Fernando Valley route, except for a 2.1 mile subway stretch.

Gibbs and Hill, another New York engineering firm which studied the project, made the following estimate on the cost of steel items involved: girders, rails, turn-arounds and terminal loops, $40.9 million; foundations and anchor bolts, $14 million; girders and supporting sections, $1.4 million; steel for subway construction, $9 million.

Average 41 Mph . . . The cars would be electrically operated and would run 27 ft above street level. Maximum speed would be 60 mph, average speed including stops would be 41 mph. Supporting pylons would be placed 60 to 100 ft apart with single rails on each side.

Airplane-type cars would be double-truck units, 50 ft long, with seating for 67. Plans call for semi-monocoque construction. If legislative and financial hurdles can be cleared, the system would be completed by 1959 and would handle approximately 80 million passengers per year.

Legal Roadblocks . . . Several legislative roadblocks loom ahead. The recommendation stipulated that to be economically feasible and financially attractive for revenue bonds, the system must be exempt from heavy taxation and have the authority to set its own fares. This fare-setting recommendation requires legislative approval. Last minute efforts were being made to get consideration of the measure by the legislature.

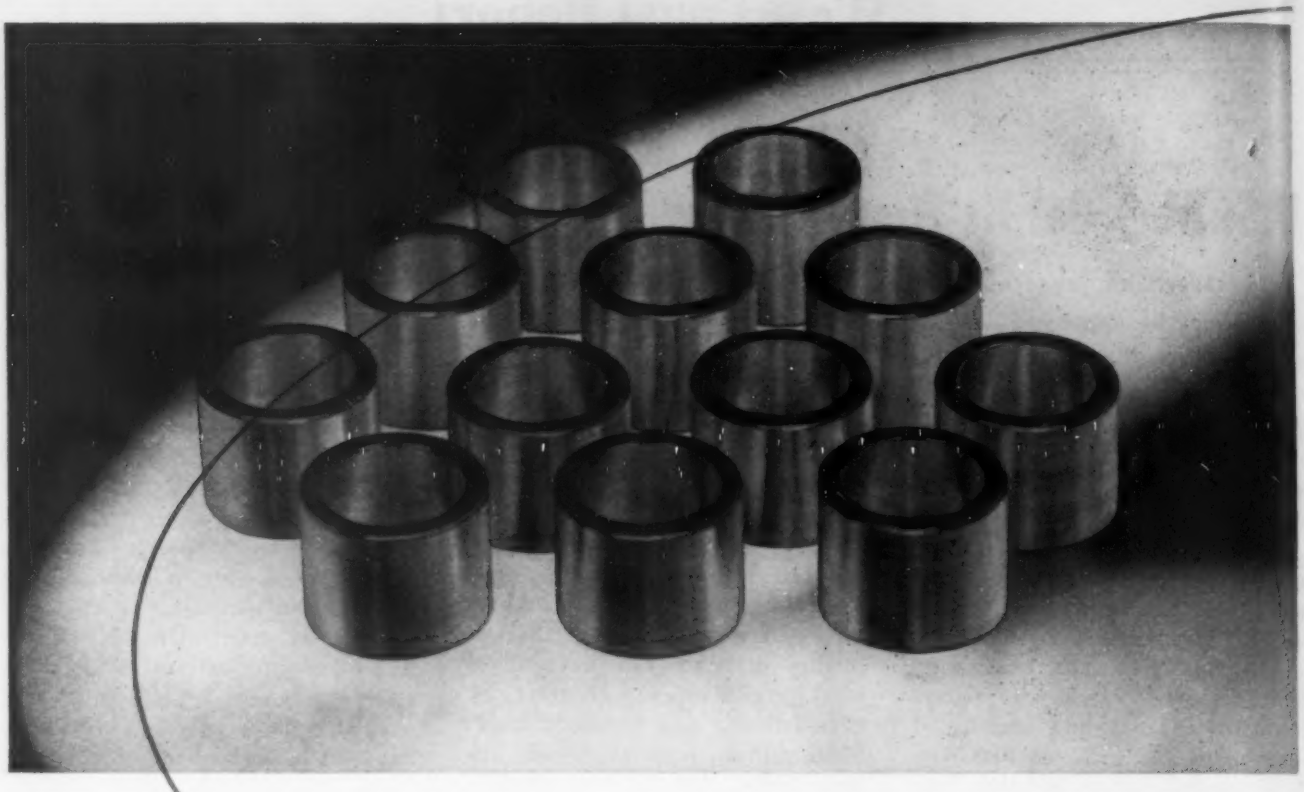
Rubber Tires Possible . . . An alternative system which may also get consideration in Los Angeles is for rubber-tired buses. These would run on elevated tracks along freeways for express service and then switch to roads.

DEADLY nerve gas is being made at the Rocky Mountain Arsenal near Denver. Workers must wear gas masks and rubberized suits to protect themselves from the lethal gas.

Kaiser Buys Interest . . . Kaiser Steel last week entered the container field with purchase of a third interest in Myers Drum Co., San Pablo, Calif. The firm has an annual rated output of 4000 drums and 10,000 pails and is competitive with the Boyle Mfg. Div., a U. S. Steel subsidiary in Los Angeles and Alameda, Calif., and Rheem Mfg. Co., a major container manufacturer with 24 pct of its stock owned by Bethlehem Steel.

Build Can Plant . . . The West's largest independent can firm is out to conquer new fields. Pacific Can Co. of San Francisco last week announced purchase of 10 acres near Denver for a $2 million plant. Seven lines will be put in, largely devoted to can production for beer and soft drinks.

No. 9 in a Series



these requirements in mind...

So varied are the demands on multiple spindle automatics it is impossible to design into one model — or a number of models — all the facilities that will satisfy every requirement. To excel in any range of work the design of a machine of this type must be directed toward that work.

Cone's new General Datalog lists over forty CONOMATIC models that are designed with these requirements in mind. For any range of work, Conomatics are built to more efficiently serve the latest cutting tool materials.

data for comparison

Part	Bushing
Machine	1⅛" Six Conomatic
Tools	100% Carbide Tipped
Material	Stainless Steel Tubing
Stock Size	1¼" OD; ¾" ID
R. P. M.	Work Spindle — 1033 Opposed Spindle—1048
Time	7 Seconds per Cycle 3.5 Seconds per Piece

Conomatic}

CONE AUTOMATIC
MACHINE COMPANY, INC.
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New Tool Sales Pattern Variable

February orders lag . . . Still above post-Korea low point . . . Special tools in demand . . . Research programs promise changes . . . Long term future good—*By E. J. Egan, Jr.*

Total new orders to U. S. machine tool makers fell off slightly in February as compared with January new business. Latest industry statistics prepared by National Machine Tool Builders' Assn. Place the February new order index at 160.2, a drop of 13.3 points from the final January figure of 173.5. In February, 1953, the new order index was 282.1.

NMTBA measures new orders, shipments and demonstrated production rates for the industry against an index base of 100 established during the years 1945 through 1947.

Basic Upward Trend

Shipments of American-made machine tools were up a trifle in February to an estimated index of 321.3. This is a couple of points above the January mark of 319.4. In February, 1953, this shipment index was calculated at 354.5. For the past 18 months shipments have been consistently ahead of new orders as backlogs for the defense program have been whittled down. Present industry backlog is estimated at about five months production.

Builders attribute some of the decline in February new business to the short month, cut further in many areas by holiday observances. Optimists point out that the basic trend of new orders is still upward, since February sales stayed above the industry's post-Korean low which occurred last November. Then the new order index stood at 146.6, 13.6 points below the latest level.

Uneven Sales Curve

Machine tool sales executives are generally hopeful about the immediate and long-term future. But they concede that month-to-month sales figures are apt to follow a saw-tooth pattern. Some of the more competitive tools aren't moving too well by comparison to the frantic building of a year or two ago. But business for the big, special-purpose tools for mass production seems to be holding up quite well.

Hush-Hush Research

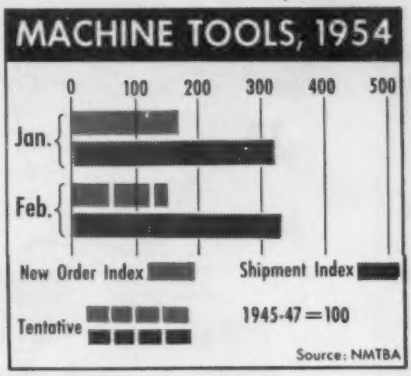
Research and development programs are being pushed intensively. Most progressive builders seem to have a few tricks up their sleeves. Visitors to their plants are quite likely to see a door in some section of the shop marked "No Admittance," and that means just what it says.

Ask your plant guide what goes on in that department and he starts talking about the weather. Such reluctance to talk is reminiscent of the automotive industry's secrecy when it comes to styling changes. But with machine tool builders, the visitor gets the definite impression that the closed doors hide much more than a few modest improvements or changes for the sake of appearance.

Exports Lead Imports

Talking to machine tool builders about the threat of foreign competition doesn't seem to generate quite as much heat under their collars as it did awhile back. A couple of years ago, during the Korean emergency, European tools of all types were eagerly sought here. But importers of foreign equipment aren't selling many of their standard machines to American manufacturers right now.

Specialized, precision equipment made overseas is a somewhat different story. In this category are



the tools which American builders don't compete with. But annual dollar volume of imports here is a small fraction of the amount of American equipment sold overseas.

U. S. machine tool exports may not be up to pre-World War II totals, but they still outweigh imports by a comfortable margin. From 1950 to early 1953, Great Britain ordered 18,618 machine tools for its defense program from builders outside the United Kingdom. Approximately one-third of this business went to U. S. and Canadian builders, with American firms getting the lion's share.

No additional orders for the British defense program have been placed during the past 12 months.

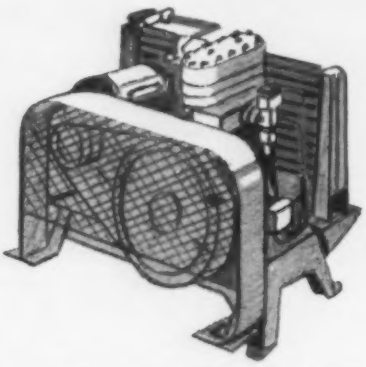
Russia In Tool Show

Next European Machine Tool Exposition will be held in Milan, Italy in September. Indications from Europe are that Russia wants to get into the act in a big way. Top officials of the Russian Ministry of Foreign Commerce are reported to have visited the Show's management in Milan.

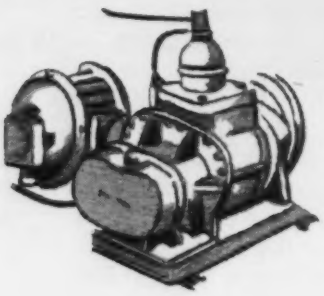
What do the Russians want? About 15,000 square meters of preferred exhibit space. To meet the Soviet demands, sponsors of the Show would have to take previously reserved space away from other nations, more than 14 of whom have already signed up to exhibit their wares. It is still doubtful whether an agreement will be reached with the Soviet representatives.

FROM *the Bundy Sketchbook*
TO *jog a designer's imagination*

COMPRESSOR LINES



SERPENTINE COILS IN CONDENSER UNIT



VACUUM PUMP LINES

TV TRAY TABLE

REMARKS Is that cost-saving idea wasting away in a notebook? Then why not let expert Bundy engineers help bridge the gap between idea and finished product. They offer you specialized engineering skills, unmatched fabrication facilities, plus the priceless extra of Bundyweld, the only tubing double-walled from a single strip (see below).

WRITE today for catalog for help in developing your tubing ideas.

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Bundyweld starts as a single strip of copper-coated steel. Then it's . .

continuously rolled twice around laterally into a tube of uniform thickness,

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Bundyweld, double-walled and brazed through 360° of wall contact.

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DOUBLE-WALLED FROM A SINGLE STRIP

Leakproof	Lightweight
High thermal conductivity	Machines easily
High bursting point	Takes plastic coating
High endurance limit	Takes plating
Extra-strong	Bright and clean
Shock-resistant	No inside bead
Ductile	Uniform I.D., O.D.

Bundy Tubing Distributors and Representatives: ***Bridgeport, Conn.:*** Korhumel Steel & Aluminum Co., 117 E. Washington St. • ***Cambridge 42, Mass.:*** Austin-Hastings Co., Inc., 226 Binney St. ***Chattanooga 2, Tenn.:*** Peirson-Deakins Co., 823-824 Chattanooga Bank Bldg. • ***Chicago 32, Ill.:*** Lapham-Hickey Co., 3333 W. 47th Place • ***Elizabeth, New Jersey:*** A. B. Murray Co., Inc., Post Office Box 476 • ***Los Angeles 58, Calif.,*** Tubesales, 5400 Alcoa Ave. • ***Philadelphia 3, Penn.:*** Rutan & Co., 1717 Sansom St. • ***San Francisco 10, Calif.:*** Pacific Metals Co., Ltd., 3100 19th St. • ***Seattle 4, Wash.:*** Eagle Metals Co., 4755 First Ave., South • ***Toronto 5, Ontario, Canada:*** Alloy Metal Sales, Ltd., 181 Fleet St., W.

Bundyweld nickel and Monel tubing are sold by distributors of nickel and nickel alloys in principal cities.

REPORT TO MANAGEMENT . .

Ike took his hat off

Turns out the "idles" of March didn't mean a thing. In one of his rare off-the-top-of-the-head statements the President last month tabbed March as a critical period in the business decline. Intimated the government might have to cut personal income taxes to jazz up consumer spending if March employment weren't up-trending.

But at his press conference last week the President shifted the economic turning point to April, said there was no need at present for a slambang government anti-recession program. And Treasury Secretary Humphrey threw in his own forecast that the economy may not show an upturn until May.

But what happens if May comes in with that tired recession look? Presumably the quickest way to hypo the economy would be through a tax cut--either by increasing personal income tax exemptions or by lowering the tax rate.

But will Ike be able to do this after going to the people with his courageous argument against further tax cuts? If he does, it will be a bald admission the Administration muffed its analysis of the economy. And that's not the surest method of piling up Republican votes in an election year.

Red-faced under klieg lights

Further evidence an economic upturn may be a little late this year is Federal Reserve Board's recently released annual survey of consumer finances. Study showed some tendency for consumers to delay purchases of durable goods longer than they did in 1953.

And for those watching auto trends: The number of people planning to buy new cars is smaller than in either last year or 1950, greater than in '51 or '52. There was no change in the number planning to purchase a used car, but most said they'd pay less.

About 14 pct believe they will earn less this year, compared with 10 pct who expected earnings to drop last year.

See signs of strength

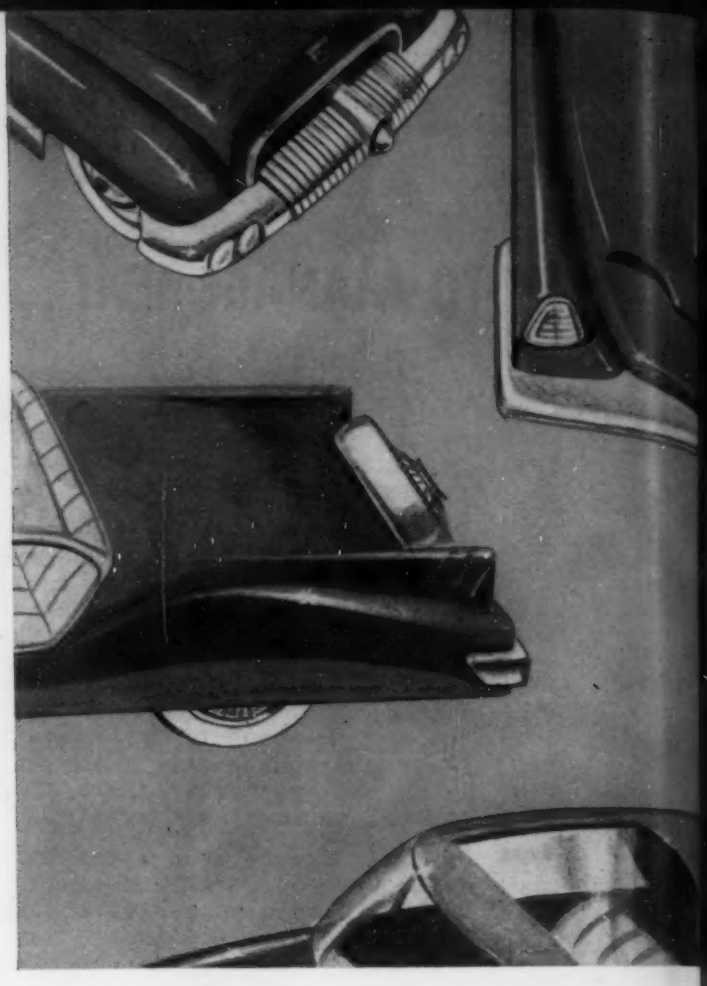
But purchasing agents for the second consecutive month saw definite signs of growing economic strength. National Assn. of Purchasing Agents says that for the first time since last May the number of PA's reporting an increase in industrial production and orders was greater than the number signalling a decrease.

Inventories were reported lower by 44 pct of the purchasing agents, while 45 pct said there was no change in stocks. The association interprets this as meaning inventory adjustments by many companies have been completed.

A shoe-shine isn't enough

If you're in the market for a new salesman, shop carefully. A recent study shows it costs an average of about $5,430 to obtain a successful salesman (one who lasts out his first year with a company).

Failures, salesmen who leave within the first year, account for most of the cost, $2,500. Compensation loss, the amount of income not earned by a first year salesman amounts to around $1500, training, $1000. Rest of the expense is for recruiting, screening, testing.



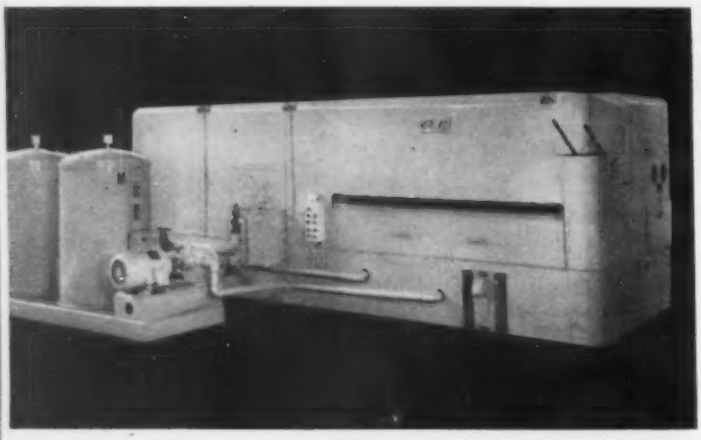
To Look their Best

AUTOMOBILES, Too Require A Beauty Treatment

The Beauty Salon takes care of the lady. The McKa Flex-Roll Processor takes care of the automobile. More than 90 percent of all the steel used in mod- ern motor car bodies, doors and fenders is run through a McKay Flex-Roll Processor prior to draw

The Flex-Roll works the steel, imparting a uniform condition throughout the sheet, which allows it to b drawn without showing strain marks. This results i smoother, blemish-free surface, adding to the bea of the new car finish.

Many other industries, where deep drawing is requi are finding the McKay Flex-Roll works as well f them, minimizing rejects and giving their product a better finish. If deep drawing is part of your business you can't afford to be without a McKa Flex-Roll Processor. Write today for details.



The McKay Flex-Roll Processor

The McKAY MACHINE Company
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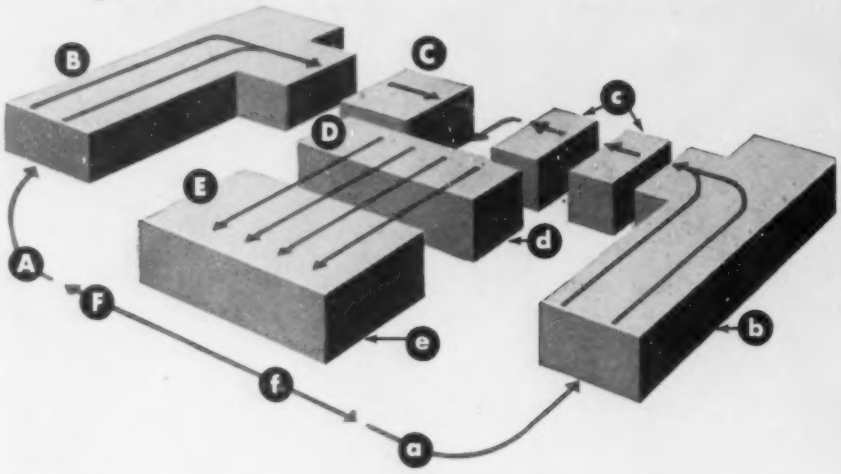
IN CANADA - The WALLACE BARNES CO., Ltd., Hamilton, Ontario

Heat Treat Furnace Layout

by *Holcroft* ...6th of a Series



A. Load
B. 2-row continuous atmosphere carburizing furnace
C. Oil quench
D. 4-row washing machine
E. 4-row draw furnace
F. Unload

a. Load
b. 2-row continuous atmosphere carburizing furnace
c. Salt bath quench and air blast cooling station
d. 4-row washing machine
e. 4-row draw furnace
f. Unload

How to Beat Heat Treat Costs!

Here's a furnace layout which is tricky—yet functional; one which steps up production—yet is flexible enough for different cycles!

Holcroft designed it to handle a variety of transmission parts requiring different processing cycles. In one case, parts are carburized, oil quenched, washed, and drawn. In the other, the stock is carburized, quenched in a salt bath, cooled with an air blast, washed, and drawn. The wash machine and draw furnace, though common to both cycles, are electrically independent.

While production flows at a rapid pace, the battery is so automatic that only a two-man crew is required for loading and unloading—one man on each side!

This is the type of furnace engineering that pays off in lower heat treat costs *to you!* And it's available on simple single-furnace jobs, or complex multi-furnace installations. It will pay you to write for more information—today! Holcroft & Company, 6545 Epworth, Detroit 10, Michigan.

BUILT BY HOLCROFT & COMPANY DETROIT, MICH. — PRODUCTION HEAT TREAT FURNACES FOR EVERY PURPOSE

CHICAGO, ILL. • CLEVELAND, OHIO • HOUSTON, TEXAS • PHILADELPHIA, PA.

CANADA
Walker Metal Products, Ltd.
Windsor, Ontario

EUROPE
S. O. F. I. M.
Paris 8, France

—Free Publications—

Continued

Broaching

New 2-color wall card listing broach troubleshooting and gear shaving check points is now available. Check points listed for broach troubleshooting are under general headings of the Broach, the Part, the Machine, and the Coolant. *National Broach & Machine Co.*

For free copy circle No. 15 on postcard, p. 99.

Pumps, assemblies

Trabon Engineering Corp. has published a 4-p. illustrated catalog on its line of Hydra-Lube Pumps and Reservoir Assemblies. Dimensions, as well as a diagram drawing of the method of connecting the pump to any hydraulic circuit are included. *Trabon Engineering Corp.*

For free copy circle No. 16 on postcard, p. 99.

Calculator

Wittek Mfg. Co. is offering a slide rule calculator for determining at a glance the correct sprocket ratio to be used on the chain drive for the Wittek automatic roll feed for punch presses. The sprocket ratio determines rate at which stock is fed to press for each piece. *Wittek Mfg. Co.*

For free copy circle No. 17 on postcard, p. 99.

Melting furnaces

New bulletin on Simplex melting furnaces contains photographs of the furnaces as well as specifications, diagrams, performance and other technical data. *Lindberg Engineering Co.*

For free copy circle No. 18 on postcard, p. 99.

Gears

Complete 8-p. brochure gives details of the Certified Brad Foote program. Illustrations are given of some of company products. *Brad Foote Gear Works, Inc.*

For free copy circle No. 19 on postcard, p. 99.

Tool grinder

Exclusive features and illustrations of the wet and dry carbide tool grinders are given in recent release. *Hammond Machinery Builders, Inc.*

For free copy circle No. 20 on postcard, p. 99.

Time delay relay

Model SF Agastat hermetically sealed time delay relay is described in recent bulletin. The model is extremely compact and mass spectrometer tests have proved its ability to seal against dust and moisture. *AGA Div., Elastic Stop Nut Corp. of America*

For free copy circle No. 21 on postcard, p. 99.

"...and they can fabricate their tube into the parts we need!"

"And, even more important, fabricated tubular parts cost less money!

"Take the job we had at the plant last week. If we had followed the original suggestions, we would have had to form and assemble three different pieces. But Wolverine gave us a better answer.

"They just took a 6" length of 1½" diameter tube. Using their unique Spun End Process†, they closed one end completely, reduced the other end to ⅜" diameter, added a bead, and there we were."

"I remember the cost sheet. We knocked off 6¢—just about half!"

"That's right! And on this job, where we need to save space, I'm going to suggest Wolverine Trufin*."

"What's that?"

"It's a one-piece finned tube—the fins are actually part of the tube wall—integral, they call it. They can bend Trufin, coil it, fabricate it, just like plain tube."

★ ★ ★ ★

WANT TO SEE IT IN BLACK AND WHITE? Just give us a chance to show you how much we can save in fabricating a tubular part to your specs. And—remember Trufin—it's available in copper, copper-base alloys, aluminum, steel or bi-metal. Write for Wolverine's booklet "Fabricated Tubular Parts" today. WOLVERINE TUBE DIVISION, of Calumet & Hecla, Inc., 1477 Central Avenue, Detroit 9, Michigan.

Wolverine Trufin and the Wolverine Spun End Process available in Canada through the Unifin Tube Co., London, Ontario

† A PATENTED PROCESS RE.22465
* REG. U.S. PAT. OFF.

EST. 1916

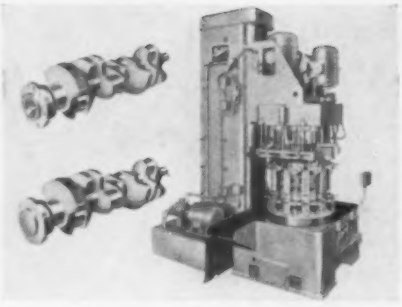
WOLVERINE TUBE DIVISION
OF CALUMET & HECLA, INC.

Manufacturers of Quality-Controlled Tubing

PLANTS IN DETROIT, MICHIGAN, AND DECATUR, ALABAMA. Sales offices in principal cities.

NEW EQUIPMENT

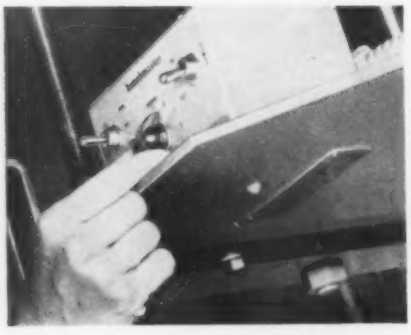
New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 99 or 100.



Multiple-spindle machine processes crankshafts

Twenty-six operations on 96 crankshafts per hr at 80 pct efficiency are accomplished on this special multiple-spindle machine. Designed to process crankshafts on a new V-8 engine, this high production equipment consists of a 26-spindle combination drilling and tapping head, a 10-station holding fixture and a precision automatic index table. Operation includes drilling and tapping six 7/16-20 holes, drilling and reaming one 7/16 dowel hole, plus drilling, reaming and counterboring center hole. *Buhr Machine Tool Co.*

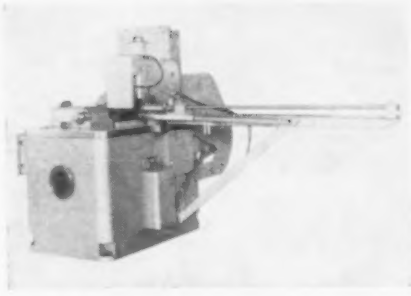
For more data circle No. 22 on postcard, p. 99.



Electronic timer provides delayed shut-off or start

New Tele-Trol electronic timer, available for application to a wide variety of mechanical and electrical equipment, is continuously variable from 0 to 10 sec and immediately recycles when triggered. Since it is the accumulative type the recycle time is added to the balance of the previous cycle, if triggering occurs before shutoff is reached. The Tele-Trol timer handles a 30 amp non-inductive load at 125 v ac. Timer operates on 110 v single phase; models available for 220/440 v 3-phase operation. Overall size is approximately 3 x 4 x 5 in. *Benchmaster Mfg. Co.*

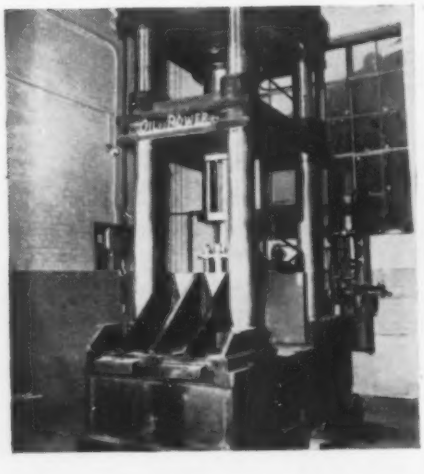
For more data circle No. 23 on postcard, p. 99.



Tube cut-off machine makes 6000 cuts per hour

Steel tubing can be cut at the speed of 6000 cuts per hr with a new tube cut-off machine that employs a principle using two special true blades, one horizontal, one vertical. Tubing of any diameter up to 2 in. of any ordinary wall thickness and of any shape can be cut. Operation is fully automatic with a feed rate of 600 fpm. Precision clamping dies which hold the tubing during cutting time prevent any distortion of the tube; reduces the burr. Combination clutch and brake is a feature of the machine. *Grieder Industries, Inc.*

For more data circle No. 24 on postcard, p. 99.



Presses special shapes from titanium powders

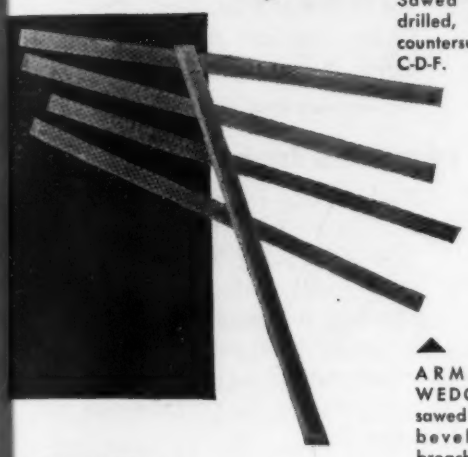
Included in a new line of powder metal hydraulic presses is this press used at Firth Sterling Co. for pressing special shapes from titanium powders, and for pressing zirconium sponge. The press has a 1250-ton double-acting top ram and a 900-ton double-acting side ram. It can be used for split die pressing of powders and for titanium and zirconium sponge. Top and side rams can be operated independently. Of all-welded steel construction, the press is compact, self-contained, requiring floor space for both press and hydraulic power unit of 8 x 10 ft. Press stands over 22 ft high, has daylight of approximately 8 ft. Hydraulic unit is powered by a 40 hp electric motor, and has a 250-gal oil reservoir. Side ram has no obstructing tie rods; has a side ram working area exceeding 2 x 4 ft. *Oilpower Engineering Co.*

For more data circle No. 25 on postcard, p. 99.

Turn Page

For high heat applications C-D-F Melamine Dilecto cleanly machined by C-D-F

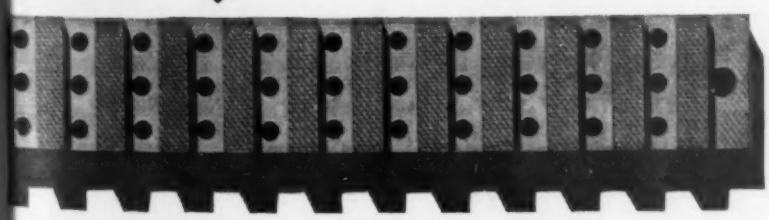
AIRCRAFT PANEL BOARD — GB-28M, ¼" laminate. Sawed to shape, holes drilled, counterbored and countersunk. Machined by C-D-F.



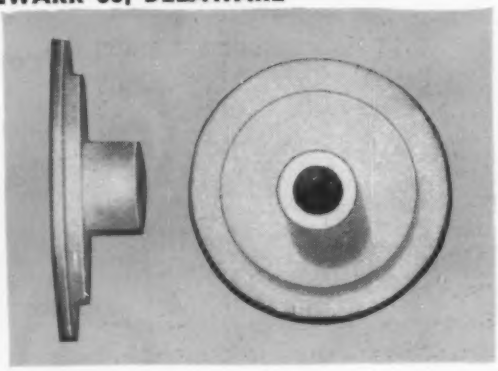
ARMATURE SLOT WEDGES — GB-28M, sawed into strips, then beveled edges were broached to angle of 21° 23′, and strips were cut to exact length. Machined by C-D-F.

RF COIL FORM — Natural GB-112M Dilecto rolled tubing, smooth edged. Sawed to length; drilled and burred by C-D-F.

TERMINAL BLOCK—GB-28M. Sawed to shape, grooves milled, corners sanded round. Holes were drilled, counterbored, characters stamped. Machined by C-D-F.



INSULATOR — ML rod. Turned on automatic screw machine by C-D-F. Grade ML is a fine weave cotton fabric base laminate bonded with a melamine resin. Easy to machine.



As operating temperatures rise, melamine laminated plastics can satisfy many requirements for component parts. Glass base melamine grades of Dilecto resist elevated temperatures —up to 300° F. continuously, 350° F. intermittently. They have extremely high impact strength; excellent arc resistance and self-extinguishing properties. C-D-F melamine Dilecto grades are usually specified for many electrical applications requiring high arc resistance, mechanical strength, flame and heat resistance.

C-D-F can supply melamine Dilecto in sheets, tubes and rods in the following grades:

GB-28M—Medium weight glass base laminate with melamine resin. Highest mechanical strength; excellent arc resistance, high heat and flame resistance; self-extinguishing. Dimensionally stable—little affected by temperature and humidity.

GB-112M—Lightweight glass fabric with melamine resin. Substantially same characteristics as GB-28M. Usually produced in thickness less than 1/32".

GM-1—Glass mat base melamine resin bonded laminate. A lower cost product suitable for many applications requiring arc resistance along with good mechanical strength and flame resistance.

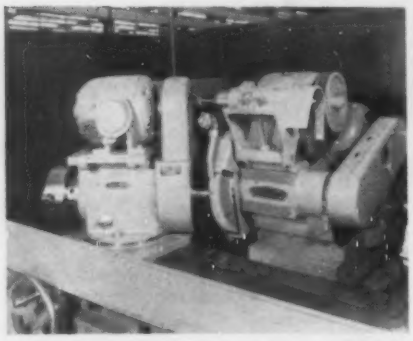
USE COMPLETE MANUFACTURING FACILITIES OF C-D-F. Make us responsible for your complete job . . . from laminates to finish machining of components. C-D-F has the know-how to cleanly machine melamine Dilecto to close tolerances. C-D-F can save you time, money and waste of material. And when you make C-D-F responsible for the complete job, you know what you're getting: components machined to exact specifications; strict adherence to quoted prices; and prompt delivery.

Write for samples and technical bulletins on melamine Dilecto components. Call in a C-D-F sales engineer, tell him your problem. He'll help you.

THE NAME TO REMEMBER CDF MELAMINE DILECTO

Continental-Diamond Fibre Company

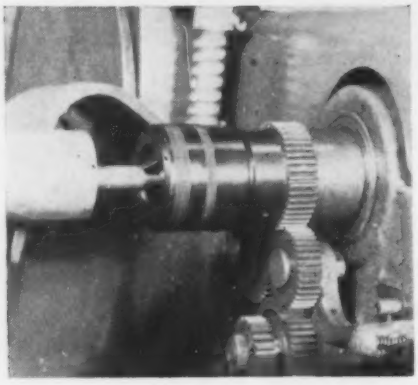
NEWARK 85, DELAWARE



Simplified setups and fast, precise grinding action

Design of a new universal grinding machine, the 12-in. type U-4, provides extra versatility through simplified setups and fast, precise grinding action for limited production items. Principal new feature is the swiveling headstock which has a dog drive plate on one end for conventional grinding and a 5-in. D-1 cam lock nose on the other end for mounting chucks or fixtures. To change from a dog-drive setup to a chucking operation, it is only necessary to rotate the headstock 180° and set up the work. A work speed range of 40 to 400 rpm is available at the turn of a dial. Quick changes from and to internal grinding is possible. *Norton Co.*

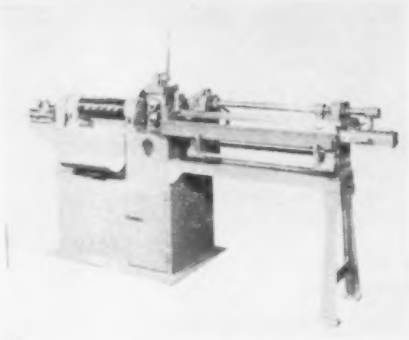
For more data circle No. 26 on postcard, p. 99.



Aligns, then holds bar stock during machining

The John-Chuck is a centering device for use on lathes. It aligns bar stock and holds it firmly in place during machining operations. It is instantly adjustable to any size stock up to 1⅜ in. diam or 1⅛ in. hex. It fits all 1⅜ in. spindle Logans. Adapter bushings are available for other lathes and draw bar type collet closers. The John-Chuck is mounted on the rear of the lathe spindle; becomes a permanent part of the machine and eliminates having to machine a new bushing for each different setup. In addition the chuck will hold a tube through which short pieces of stock may be fed by use of a bar feed. The John-Chuck may also be used as an interior collet stop. *Johnal Co.*

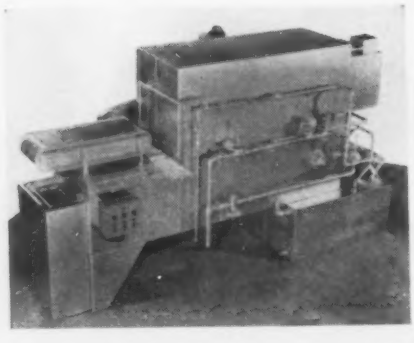
For more data circle No. 27 on postcard, p. 99.



Waves, bends and kinks removed from wire

Low-cost, high speed rotary wire straightening and cutoff machine removes waves, bends and kinks from 1/16 to ¼ in. diam wire and cuts lengths up to 40 in. at rate of 125 fpm. The wire is hand fed into a series of three-roll-prestraighteners which directs the wire through the flyer or straightening arbor. The wire then enters a two-roll feed housing which feeds it into the guide bar where it is gaged and cut to length. Desired lengths are cut by a positive stop gage. Feed and speed of the machine can be fitted to users' requirements. Standard models can be varied to meet special requirements. *G. C. Patterson Machine Co.*

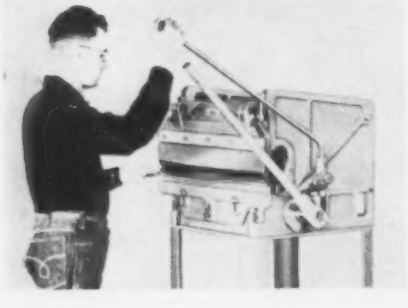
For more data circle No. 28 on postcard, p. 99.



Hardening furnace has 150 lb per hr capacity

Semi-continuous clean hardening furnace is a packaged unit. It is radiant tube gas fired, and includes a built-in generator, quench tank, quench tank conveyor, and loading and furnace conveyors. For efficient operation, the loading and furnace conveyors are integrally driven; a separate drive is provided for the quench tank conveyor. The CA-150 furnace operates on 110 v current; 220/440 v operation is optional. Overall dimensions of the furnace are 16½ ft long x 5 ft 10 in. wide x 7 ft 5 in. high permitting an effective working area 5 ft long x 1½ ft wide on the conveyor belt. *Industrial Heating Equipment Co.*

For more data circle No. 29 on postcard, p. 99.



Press brake for short run forming operations

New hand operated press brake will form 16 gage mild sheet steel across the full 24-in. forming width, 10 gage mild sheet steel across a 12-in. forming width as well as inconel, brass, aluminum, stainless steel, chrome molybdenum and all other ductile materials. A special cam lever mechanism provides ample power for forming, blanking, piercing, drawing, and tripping operations plus a ratchet drive system that multiplies the power for heavy forming jobs. A complete line of standard dies and specials is available. *O'Neil-Irwin Mfg. Co.*

For more data circle No. 30 on postcard, p. 99.

Turn Page

You can do better...with
B·RIGHT·ON®
SOCKET SCREW PRODUCTS
You can't keep production up when socket screw problems are getting you down. Even such a small thing . . . one screw that doesn't start quickly or drive home correctly . . . perhaps a shipment that doesn't arrive on time . . . can hamper a fast-moving production line.
For screws that fit your needs in every way . . . quality, sizes, specifications and service . . . you can do better with B-Right-On Socket Screw Products. Best materials, most modern production methods, careful inspection and a tradition of service to users through selected mill supply houses assure your complete satisfaction.
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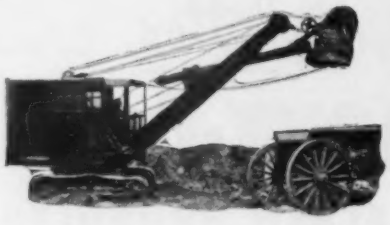
UNIT . . the Trademark that *Signifies* PROGRESS

You can always rely on equipment carrying the distinctive UNIT emblem. Backed by more than a quarter century of engineering and manufacturing experience, this well-known trademark signifies progress in crane and shovel design. It is your guarantee of obtaining the finest and most dependable equipment that money can buy.

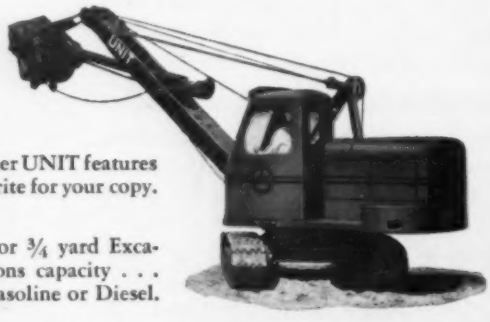
1930 — Every UNIT was equipped with ONE PIECE GEAR CASE, enclosing all gears, shafting and bearings in a constant bath of oil. Also featured was the CLUTCH SHAFT ASSEMBLY, using Disc Type Interchangeable Clutches and "Straight-in-line" engine mounting. Reduces maintenance. Improves performance.



1939 — Introduced AUTOMATIC TRACTION BRAKES. These internal expanding friction type brakes, engage and release automatically and provide traction lock without manual control. Steering is accomplished by single lever control.

1944 — Yes 10 years ago, UNIT made the "break" from the old style conventional type of cab to the UNIT FULL VISION CAB. The compact design of the upper structure enabled UNIT to make this decided improvement, giving the operator 360° of complete visibility. This exclusive feature was designed *into* the machine . . . not just tacked on.

1954 — Bring NEW DEVELOPMENTS such as: UNIT with TORQUE DRIVE — SOLENOID ACTUATED DIPPER TRIP — ALUMETALLIC CLUTCHES — Latest Crane Carrier Design and other UNIT features described in Bulletin U-1153. Write for your copy.



• • •

UNIT models available in ½ or ¾ yard Excavators . . . Cranes up to 20 tons capacity . . . Crawler or Mobile types . . . Gasoline or Diesel. Ask for literature.

UNIT CRANE & SHOVEL CORP.

6517 W. BURNHAM STREET • MILWAUKEE 14, WIS., U. S. A.

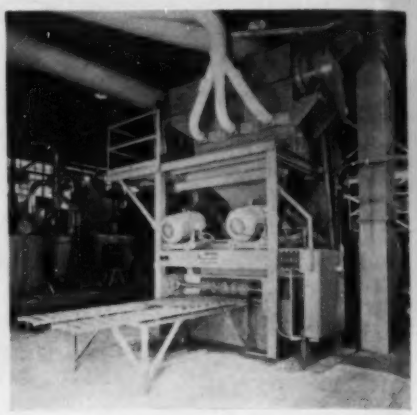
All Models Convertible to ALL Attachments!

—New Equipment—

Continued

Sheet blasting machine

New Rotoblast machine cleans steel sheet and plate up to 54 in. wide at a production rate of 20 to 80 fpm. The machine is designed to take the steel sheet or plate into the blast chamber automatically,



blast its surface, and remove all abrasive from the sheet, before it is discharged from the machine. Two Rotoblast wheels throw 160,000 lb of abrasive per hr. The machine is capable of cleaning in excess of 200 sq ft of surface per min. *Pangborn Corp.*

For more data circle No. 31 on postcard, p. 99.

Turret indicator stop

Named Sure-Stop, a new turret indicator stop aids in the duplication of machined parts requiring close tolerances. Its main purpose is to maintain length tolerances and to omit the possibility of operator

error. While hand pressure varies, Sure-Stop records the correct pressure on the indicator. The unit is mounted on the carriage of the lathe and stop mounts on the lathe bed. Can be adapted to milling machines, drill presses and other machine tools. *D-S-C Machine Co.*

For more data circle No. 32 on postcard, p. 99.

Turn Page

Certified BRAD FOOTE GEARS

No increase in price!

A NEW WAY FOR YOU TO BUY GEARS

• Now you can specify by brand name the gears or assemblies you need and be sure that every desirable quality for longer life and lower service cost will be built into them. This name—*Certified* BRAD FOOTE Gears.

Certified BRAD FOOTE Gears are made according to an exclusive BRAD FOOTE formula which controls every step in the manufacturing process. It is your assurance that the gears will have long-wearing teeth and bearing areas, and tough cores that will give service equal to or better than any other gears made.

Copper Plating* permits smooth, quick run-in. It is clean and prevents rust and corrosion before gears are put in service. It's your positive identification of the best gears that money can buy. *Yet . . . you pay no more.*

The Certificate furnished with *Certified* BRAD FOOTE Gears and assemblies certifies strict adherence to specifications and the exclusive BRAD FOOTE formula. It proves that "*no one shares our responsibility.*"

**Gears over 30" diameter are protected by copper-colored water-soluble paint which need not be removed before placing in service*

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Portable Air Grinder, fitted with Electro Type 11 Flaring Cup 6" resin grinding wheel.
Stand Grinder fitted with Electro Grinding Wheel. All three views taken at the Riverside Foundry, Bettendorf, Iowa.
Swing Frame Grinder fitted with Electro 24x3x12 resin Grinding Wheel.
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SINCE 1919
GRINDING WHEELS

TO BETTER YOUR RESULTS, LET US MAKE A JOB-SIDE SURVEY AT YOUR PLANT

Whether it's resin, and/or vitrified grinding wheels you are using, why not take advantage of the experience of others . . . who have benefited from our field technicians' effort . . . to the extent too that our company's sales volume is at an all time high. This indicates what you too may expect by accepting our offer (no cost or obligation) to make a grinding wheel survey at your plant. Simply write us TODAY: "Send a field representative to our plant."

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4L-445

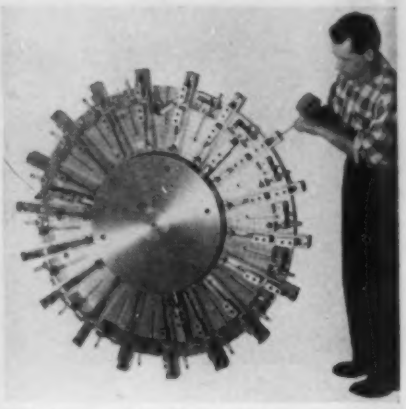
Electro Refractories & Abrasives

—New Equipment—

Continued

No distortion strain

Large turbine wheels and jet engine discs and rings can be safely machined at high speeds without fear of distortion or strain when held in the new Cushman chucks. These



chucks can be furnished on special order for either manual chucking or air power chucking for repetitive machining operation. *Cushman Chuck Co.*

For more data circle No. 33 on postcard, p. 99.

Tighter nuts

A mastic nut lock, tradenamed Zorlok, provides tighter nuts, studs and screws and eliminates lock washers and special lock nuts. Zorlok is applied by spatula, by dipping or by squeezing direct from a tube. It is applied to the bolt threads before assembly. When the nut is started, Zorlok is forced up and into the threads. It air dries in 72 hours at room temperature or in ½ hr at 350°F. Thread sealing is accomplished completely, yet the anti-seizing qualities are controlled. *Presstite Engineering Co.*

For more data circle No. 34 on postcard, p. 99.

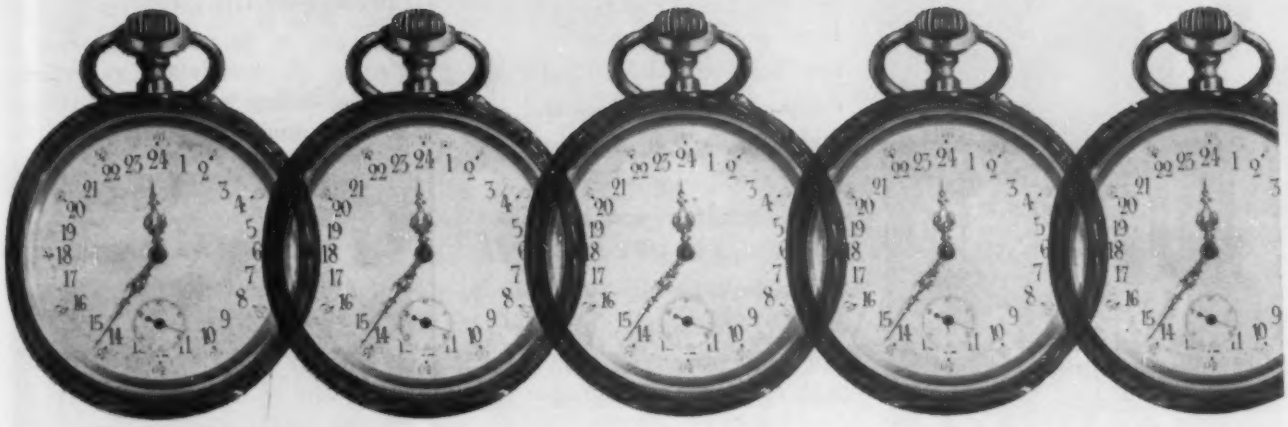
Pulpit coolers

Steel mill pulpit air conditioners have been designed for use where ambient temperatures as high as 140°F are encountered. They are split-type design with the evaporator (single or multiple) being installed within the air conditioned space and the condensing section outside. Floor and ceiling mounted styles are available. When multiple units are installed they are connected to a single condensing unit. *Dravo Corp.*

For more data circle No. 35 on postcard, p. 99.

Turn Page

You're Just Hours Away...



from a GENERAL CHEMICAL Supply Point!

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Charlotte, N. C.
Chicago, Ill.
Cleveland, O.
Denver, Colo.
Detroit, Mich.
East St. Louis, Ill.
Edgewater, N. J.
Hedges, Wash.
Houston, Texas
Jacksonville, Fla.
Kalamazoo, Mich.
Los Angeles, Calif.
Marcus Hook, Pa.
Milwaukee, Wisc.
Minneapolis, Minn.
New Orleans, La.
New York (L. I. C.), N. Y.
Oakland, Calif.
Passaic (Dundee), N. J.
Pittsburgh, Pa.
Portland, Ore.
Providence, R. I.
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36 STREAMLINED DISTRIBUTING STATIONS TO SERVE YOU...

to assure the fastest, smoothest service possible for its customers, General Chemical maintains one of the most efficient chains of warehouses and distributing stations in the country for acids, alums, phosphates and many other industrial chemicals. Presently, it has 36 streamlined distribution centers strategically located from coast to coast. Each is fully stocked with the chemicals required in the area it serves. Each is geared to supply your needs for any of the products listed below.

Why not check up on how the "G. C." distributing station in your territory can be put to work for you. For further information, just phone or write the nearest General Chemical office.

...WITH THESE PRODUCTS!

Acids **Alums** **Phosphates**
Sodium Compounds **Fluorine Derivatives**
Other Heavy Chemicals

Basic Chemicals for American Industry

Allied Chemical

GENERAL CHEMICAL DIVISION

ALLIED CHEMICAL & DYE CORPORATION

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Offices: Albany • Atlanta • Baltimore • Birmingham • Boston • Bridgeport • Buffalo • Charlotte • Chicago Cleveland • Denver • Detroit • Greenville (Miss.) • Houston • Jacksonville • Kalamazoo • Los Angeles Minneapolis • New York • Philadelphia • Pittsburgh • Providence • San Francisco • Seattle • St. Louis Yakima (Wash.) • In Wisconsin: General Chemical Company, Inc., Milwaukee

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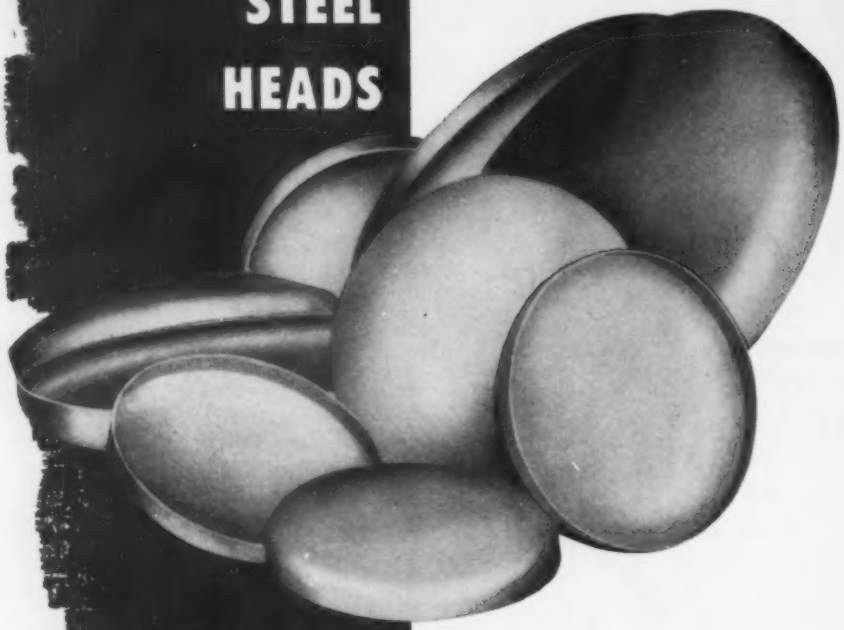
CHEMICAL PROGRESS WEEK • May 17 to 22 • *A Better America Through Chemical Progress*

"Heads-up" Service in STAINLESS STEEL HEADS

Fabricators rely on G. O. Carlson, Inc. for stainless steel heads produced to exact specifications and for other components of stainless steel tanks. Shells, flanges, rings, pads as well as spun or press-formed heads are readily available as a packaged service. This eliminates the need of multiple ordering from several suppliers and places responsibility in the skilled hands of Carlson specialists.

Carlson stainless steel heads are produced in a wide range



of sizes and gauges to ASME and standard specifications. Many styles of forming dies are available. There's an up-to-date folder describing these dies—write for your copy now!

Stainless Steels Exclusively

G. O. CARLSON, INC.

PLATES • FORGINGS • BARS • SHEETS (No. 1 Finish)

THORNDALE, PENNSYLVANIA

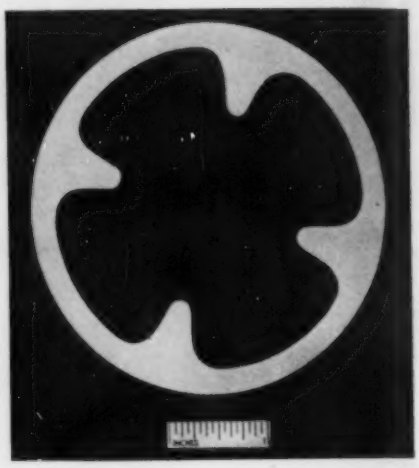
District Sales Offices in Principal Cities

—New Equipment—

Continued

Internal fin tubing

For use in heat exchangers with fire on the outside and gas on the inside, tubing with integral ID fins is being produced by extrusion. The



internal fin tubing shown is made of a special heat resisting stainless steel. Similar tubing can be produced of a number of steels in a limited size range. *Babcock & Wilcox.*

For more data circle No. 36 on postcard, p. 99.

Surface casting resin

A tough, new Toolplastik material is the L-930 surface casting resin that can be used for resurfacing metal dies, leveling die bases to eliminate machining, making form blocks, foundry patterns and core boxes. Five-minutes blending of the

hardener and the resin and the material is ready for use. Characteristics are metallic appearance, low viscosity when mixed insuring ease of pouring, 2- to 4-hr hardening time at room temperature, noncorrosiveness, and excellent metal bonding properties. *Rezolin, Inc.*

For more data circle No. 37 on postcard, p. 99.

Turn Page

New straightener automatically adjusts for different size tubes and bars

. . . has 40 TIMKEN® bearings

WHEN you switch from one size bar or tube to another, this new Sutton straightener automatically adjusts its straightening rolls to take the new size. This enables you to switch from 1¼" O.D. tube to 3¾" in less than a minute and a half!

Because straightening rolls must withstand heavy radial and thrust loads as the work passes through, they are mounted on Timken® tapered roller bearings. The taper enables the bearing to take both radial and thrust loads. Line contact between rollers and races gives them high load-carrying capacity. The net result is accurate shaft alignment and trouble-free operation.

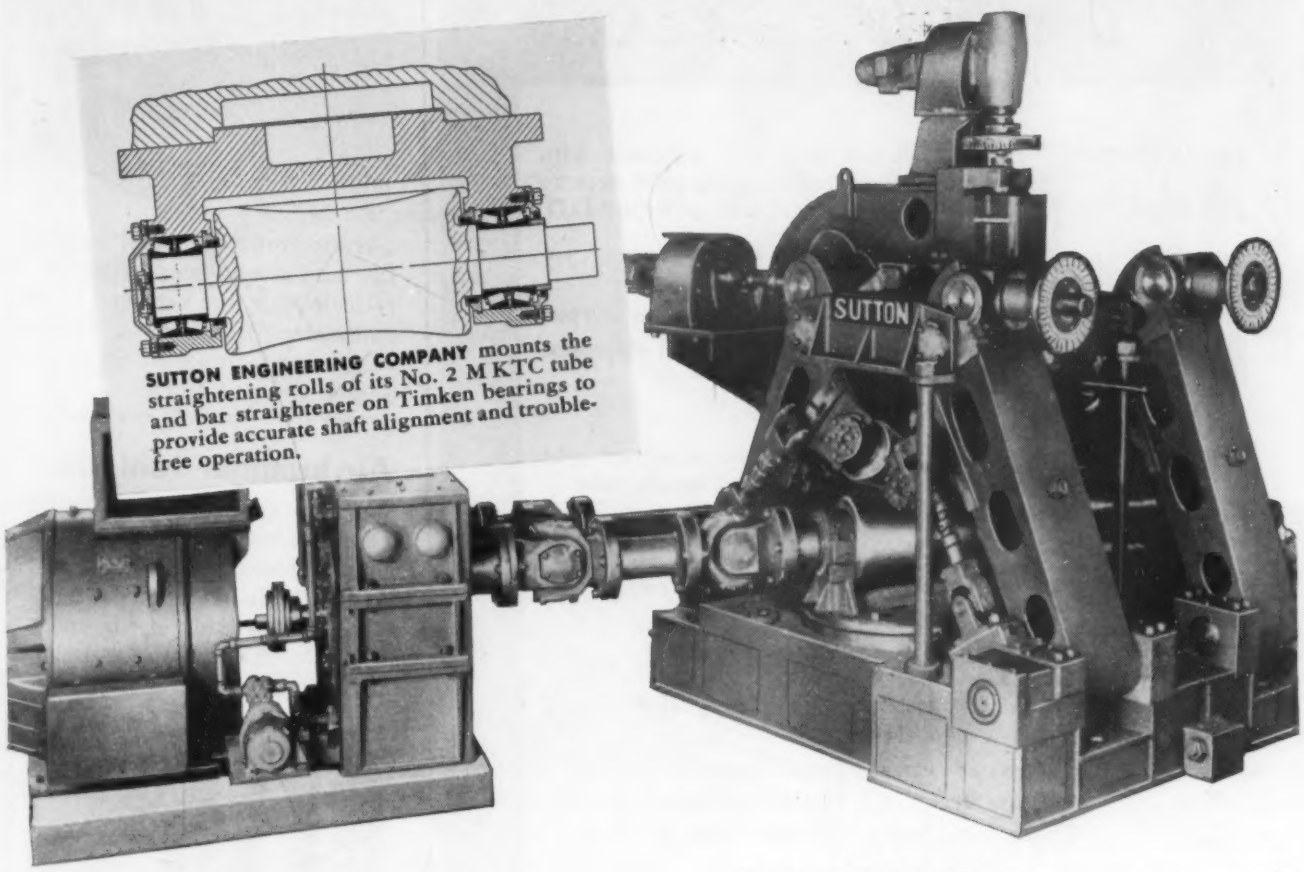
This straightener uses a total of 40 Timken bearings—in the idler rolls, universal joints, and drive unit as well as the driven rolls. Space is at a premium and the compactness of Timken bearings is a big advantage. Their high load-carrying capacity permits a relatively small-size bearing. And no space-taking thrust bearings are required.

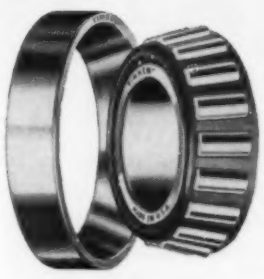
Timken bearings minimize friction because they have true rolling motion and *incredibly* smooth surface finish. This helps provide a smooth-running machine despite the heavy variable loads. It also means longer life and minimum maintenance.

Timken bearings are a sure sign of quality on the machines you buy and the machines you build. Look for the trade-mark "Timken". The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable: "TIMROSCO".

This symbol on a product means its bearings are the best.

SUTTON ENGINEERING COMPANY mounts the straightening rolls of its No. 2 M KTC tube and bar straightener on Timken bearings to provide accurate shaft alignment and trouble-free operation.





TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

DESIGN LEADERSHIP

The first Timken tapered roller bearing was produced in 1898. Since then the one-piece multiple perforated cage, wide area contact between roller ends and ribs, and every other important tapered roller bearing improvement have been introduced by The Timken Roller Bearing Company.

The Timken Company leads in: 1. advanced design; 2. precision manufacture; 3. rigid quality control; 4. special analysis steels.

NOT JUST A BALL ○ NOT JUST A ROLLER ⬭ THE TIMKEN TAPERED ROLLER ⬭ BEARING TAKES RADIAL ◫ AND THRUST →◫← LOADS OR ANY COMBINATION →✳←

World's largest stocks of 52100

STEEL TUBING and BARS

TUBES Warehouse and mill shipment with more than 200 seamless tube sizes to choose from .950" O.D. to 8.750" O.D.

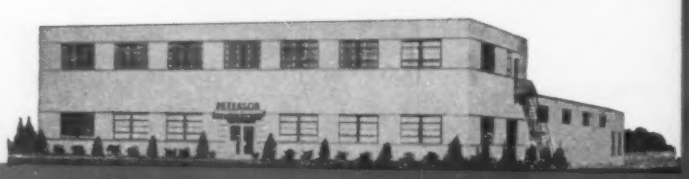
BARS In sizes from .171" round to 8.750" round. Warehouse and mill shipment.

WIRE Mill shipment of hot rolled or cold drawn ball, roller and needle wire.

FORGINGS Quick shipment of all analyses.

Write for the latest stock list

Contact our nearest office or write to Peterson Steels, Inc., Springfield Road Union, New Jersey. Address: Dept. I



PETERSON STEELS, INC.

UNION, NEW JERSEY

Detroit, Michigan • Chicago, Illinois

—New Equipment—

Continued

Micro-hardness tester

For testing small or highly finished parts a portable hardness tester combines a positive controlled diamond penetrating action with a high power microscope of 400 magnifications. The microscope is swung

directly over the impression to read the hardness by measuring with a reticule scale and vernier in 0.0005 millimeter. Result is a hardness reading of unusual precision. *George Scherr Co., Inc.*

For more data circle No. 38 on postcard, p. 99.

Air hammer tool kits

Four new air hammer tool kits for industrial maintenance and production purposes feature a powerful new 36 oz air hammer that may be operated in a straight line or at a 90° angle. Five tools are designed for scaling, peening, drilling, metal

cutting, smoothing, riveting, rivet busting and weld breaking. Kits offered are general maintenance, marine maintenance, foundry and welding. The hammer delivers 6000 blows per min. *Salsbury Corp.*

For more data circle No. 39 on postcard, p. 99.

The Iron Age

SALUTES

Vollmer W. Fries

Superior knowledge of metals and manufacturing made this auto man an asset to firm and country alike.

TECHNICAL apprentice, sales manager, dollar-a-year man—Vollmer W. Fries, vice-president in charge of manufacturing for White Motor Co., has been all of these and more during his successful career in the automotive industry.

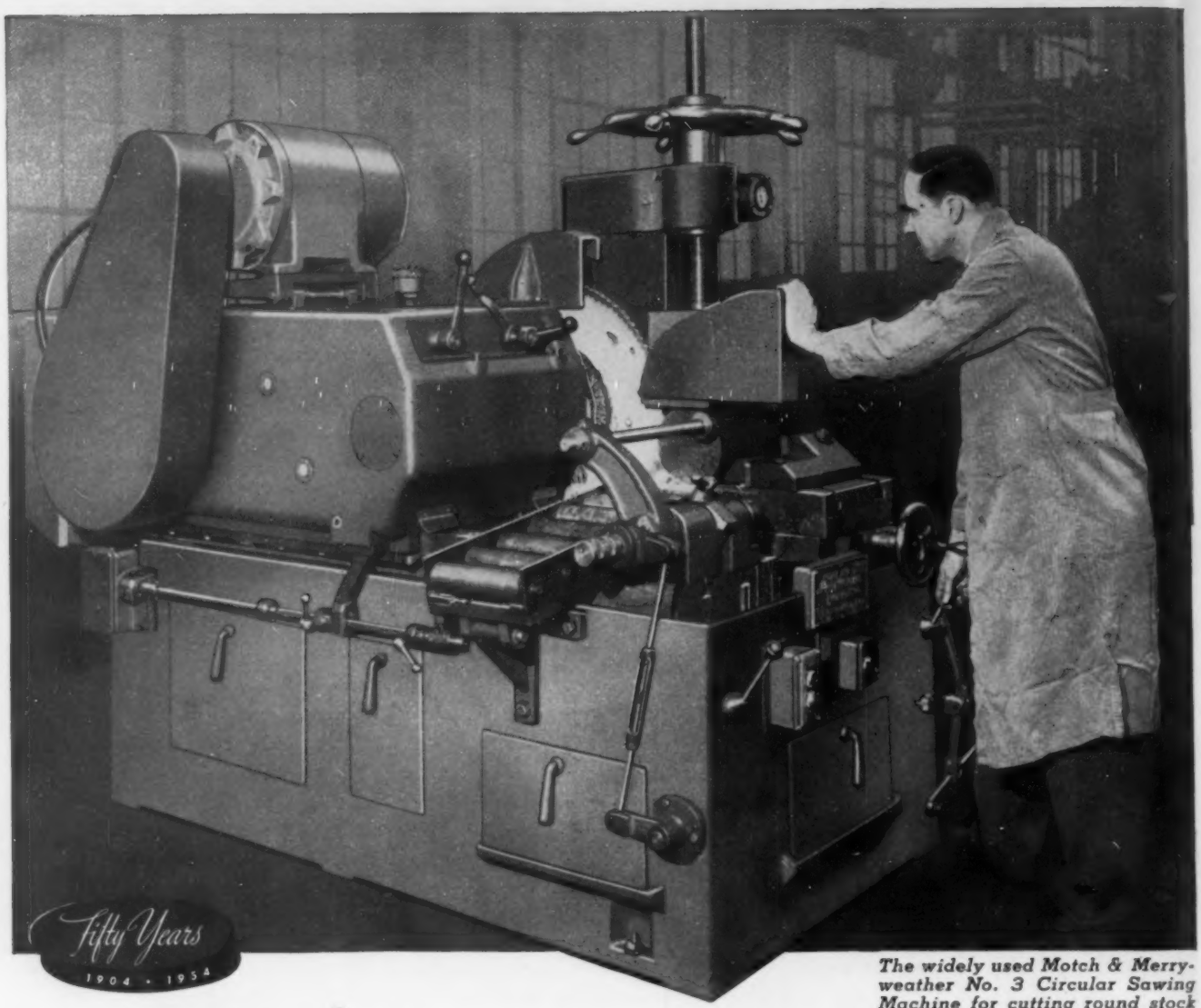
With an electrical engineer's eye for detail and organization Vol has moved steadily ahead since he graduated from Rensselaer Polytechnic Institute and joined White as a technical apprentice in 1924.

Subsequent service as sales engineer, district sales manager, and assistant to the president gave him a thorough understanding and appreciation of the major role of steel in the automotive industry.

His years of experience really paid off in the dark days of 1942 when the government searched for experts to schedule and conserve metals urgently needed for war production. At that time Vol not only served with the Conservation Div. of the WPB but was also a member of W. Averell Harriman's mission in London.

After leaving government service in 1943 he returned to Cleveland where he was appointed vice-president in charge of manufacturing operations and facilities at White.

Vol plays an occasional round of golf, but for the most part his leisure time is spent puttering around on a farm tractor at his 18-acre summer home in Chagrin Falls, Ohio.



The widely used Motch & Merryweather No. 3 Circular Sawing Machine for cutting round stock up to 10" diameter.

remember...

It's the Cost per Cut that Counts!

SECURE HIGH PRODUCTION AT LOW COST

For every ferrous or non-ferrous metal, for any shape or size, for production or short runs, — study *new high* records made by Motch & Merryweather Circular Sawing Machines employing the Triple-Chip Method and available in:

A complete size range for cutting stock up to 43" diameter.

THE MOTCH & MERRYWEATHER MACHINERY CO.

CLEVELAND 13, OHIO

Builders also of Production Milling, Vertical Turning, Automatic and Special Machines

The Iron Age

INTRODUCES

A. T. Henry, elected president, A. T. HENRY & CO.; **William S. Shiflet, Jr.,** elected vice-president and **M. Edward Speth,** becomes secretary.

Edward P. Severns, named vice-president and general manager, CONTINENTAL STEEL CORP., Kokomo, Ind.

Fred T. Wiggins, elected vice-president—commercial, UNIVERSAL ATLAS CEMENT CO., New York; **James C. McClure,** elected vice-president and general sales manager; and **Henry C. Schmielau,** comptroller, elected to the additional office of vice-president.

Chester F. Bilbert, elected vice-president and appointed general manager, Westinghouse Credit Corp., new subsidiary of WESTINGHOUSE ELECTRIC CORP.

Lawrence M. Limbach, elected vice-president-Manufacturing, RYAN AERONAUTICAL CO., San Diego, Calif.

Donald R. Moffat, elected executive vice-president, Avco of Canada, Ltd., subsidiary of AVCO MANUFACTURING CORP.

Alan T. McHenry, elected a director, UNIVERSAL PRODUCTS CO., INC. He succeeds Frank G. Smith, who has retired.

Robert A. Stauffer, and **Kenneth G. Donald,** elected to board of directors, NATIONAL RESEARCH CORP., Cambridge, Mass.

George C. Simmonds, and **Foster L. Reed,** elected to membership in the CONTROLLERS INSTITUTE OF AMERICA, New York.

Joseph V. Newman, appointed assistant auditor, DRAVO CORP.

Terrence H. M. Taylor, named chief engineer, Norstrom Valve Div. plant at Oakland, Calif., ROCKWELL MFG. CO.

Arthur A. Conrad, Jr., metallurgist, has joined the Detroit Technical Section, THE INTERNATIONAL NICKEL CO., INC., Development and Research Division.

Phil H. Richey, appointed assistant works manager, DETREX CORP., Detroit.

William T. Walling, appointed midwestern field chemist, HANSON-VAN WINKLE-MUNNING CO., Matawan, N. J.

R. G. Beck, named sales engineer in charge of new Greenville, S. C. office, THE TRANE CO., La Crosse, Wisc.; and **Robert T. Dean,** named sales engineer in charge of new Duluth, Minn. office.

Clarence S. Jarvis, becomes sales engineer, Birmingham, Ala. district office, MARION POWER SHOVEL CO.

Wesley R. Johnson, appointed eastern district manager, Shakeproof Div., ILLINOIS TOOL WORKS, Chicago.

Ernest W. Christener, appointed manager, reinforcing department, ment, Chicago plant, JOSEPH T. RYERSON & SON, INC.

Roy Cress, named superintendent, Hot Rolled Finishing Department, GRANITE CITY STEEL CO., Granite City, Ill.

SIDNEY A. STEWART, elected a vice-president, Niles-Bement-Pond Co., and will serve as chief executive officer of Chandler-Evans Div., with the title of manager.

WILLIAM J. PHILLIPS, appointed vice-president and general manager, Crawford Steel Foundry Co., Bucyrus, Ohio.

LOUIS J. BAUDIS, elected vice-president in charge of manufacturing and director, The Bullard Co., Bridgeport, Conn.

Personnel

Russel C. Burns, appointed supervisor, Motor Truck Fleet Sales, INTERNATIONAL HARVESTER CO., Chicago; **R. H. White**, appointed manager, new Lubbock, Tex., motor truck district; and **M. S. Howard**, becomes assistant manager, Lubbock, Tex.

Thomas H. Knox, appointed superintendent, Sheet Mill Division, Allenport, Pa., PITTSBURGH STEEL CO., Pittsburgh; **Paul Totten**, appointed superintendent of cold reduction.

Fred M. Porter, formerly coke sales manager for Peoples Gas Light and Coke Co., Chicago has retired from active service with the company. He plans to remain active in the solid fuel field.

Paul A. Karns, appointed manufacturing manager, Cold Rolled Products Division, CRUCIBLE STEEL COMPANY OF AMERICA. He will succeed William D. Gross who will retire May 31.

Carl L. Sadler, promoted to manager, new Aviation Division, SUNDSTRAND MACHINE TOOL CO., Rockford, Ill.; and P. A. Anderson, promoted to contracts manager.

Robert J. Wright, appointed manager of foreign operations, AIRESEARCH MANUFACTURING CO., Los Angeles.

F. Wayne Sayre, named district sales manager for the east central area, Parkersburg, West Va., plant, PENN METAL CO., INC.

C. A. Butler, Jr., promoted to director of commercial development, DIAMOND ALKALI CO., Cleveland; and **Loren Scoville**, named director of engineering.

Dan G. Gilmore, appointed assistant factory manager, CHANCE VOUGHT AIRCRAFT, INC.; **Kelly G. Smith**, becomes chief tool engineer; **Daniel N. Logan**, and **Harold L. A. Uetrecht**, appointed assistants to the factory manager.

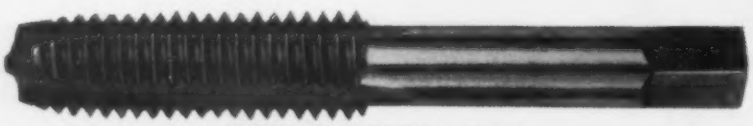
Harold E. Martin, named division superintendent, newly created Metal Cutting Tool Div., BROWN & SHARPE MFG. CO., Providence, Rhode Island.

C. HAROLD ANDERSON, appointed chief engineer, The Bullard Co., Bridgeport, Conn.

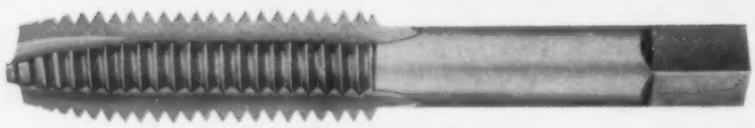
GOTTFRED L. HENDRICKSON, appointed resident sales engineer, The Udylite Corp.

ARTHUR S. KLOPF, appointed general sales manager, Missouri Coke & Chemical Div., Great Lakes Carbon Corp.

R. M. HAMMES, appointed assistant, general sales, American Machine Metals, Inc.



BEFORE PRESSURE-BLASTING



AFTER PRESSURE-BLASTING

HONE CUTTING TOOLS AFTER GRINDING FOR LONGER TOOL LIFE . . . WITH PRESSURE BLAST

MODEL A . . . ONE OF 4 STANDARD UNITS. CUSTOM MACHINES DESIGNED TO FIT SPECIAL REQUIREMENTS.

ONLY PRESSURE BLAST GIVES YOU 2-SPEED WET-BLASTING

FREE . . . Learn what PRESSURE BLAST can do for you! Die and Mold Polishing, Blending Grind Lines, Deburring Heat Treat Scale Removal, Honing of Cutting Tools, Pre-plating Cleaning . . . Hundreds of proven, money-saving applications!

Write for our new 8 page fully illustrated Booklet . . . or send samples of work you want tested to:

the CRO-PLATE Company Incorporated
747-2 Windsor Street
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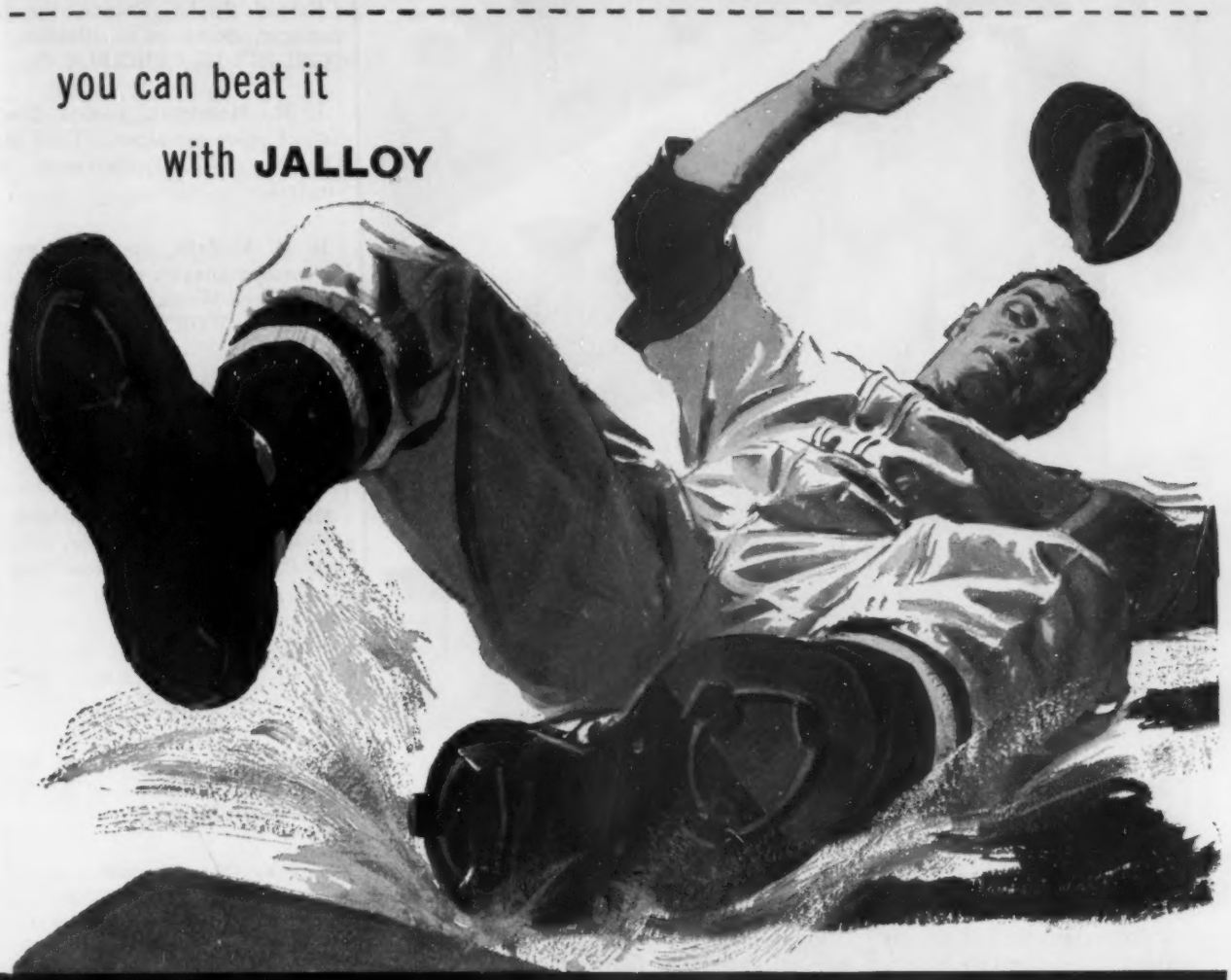
FACING A TOUGH PROPOSITION?

you can beat it

with **JALLOY**



J&L JALLOY HEAT-TREATED PLATE BEATS WEAR DUE TO ABRASION

J&L Jalloy Heat-Treated Plate is the general purpose steel that is heat treated to provide longer wear on applications where impact and abrasive conditions are severe.

In comparison with other abrasion-resistant steels as well as mild steels, it gives optimum results when heat treated to a Brinell hardness of 340 and up. Jalloy permits savings in steel costs, maintenance, and repair. Furthermore, it is easily welded.

Jalloy is available in three grades to meet various service requirements.

J&L STEEL

Jones & Laughlin

STEEL CORPORATION — *Pittsburgh*

Complete data concerning CHEMICAL COMPOSITION . . . HEAT TREATMENT . . . WELDABILITY . . . PHYSICAL PROPERTIES . . . will be mailed to you promptly. Write today.

Jones & Laughlin Steel Corporation
3 Gateway Center, Dept. 403, Pittsburgh 30, Pa.

☐ Please mail complete data concerning Jalloy.
☐ Please have your representative call.

Name_____ Title_____

Company_____

Address_____

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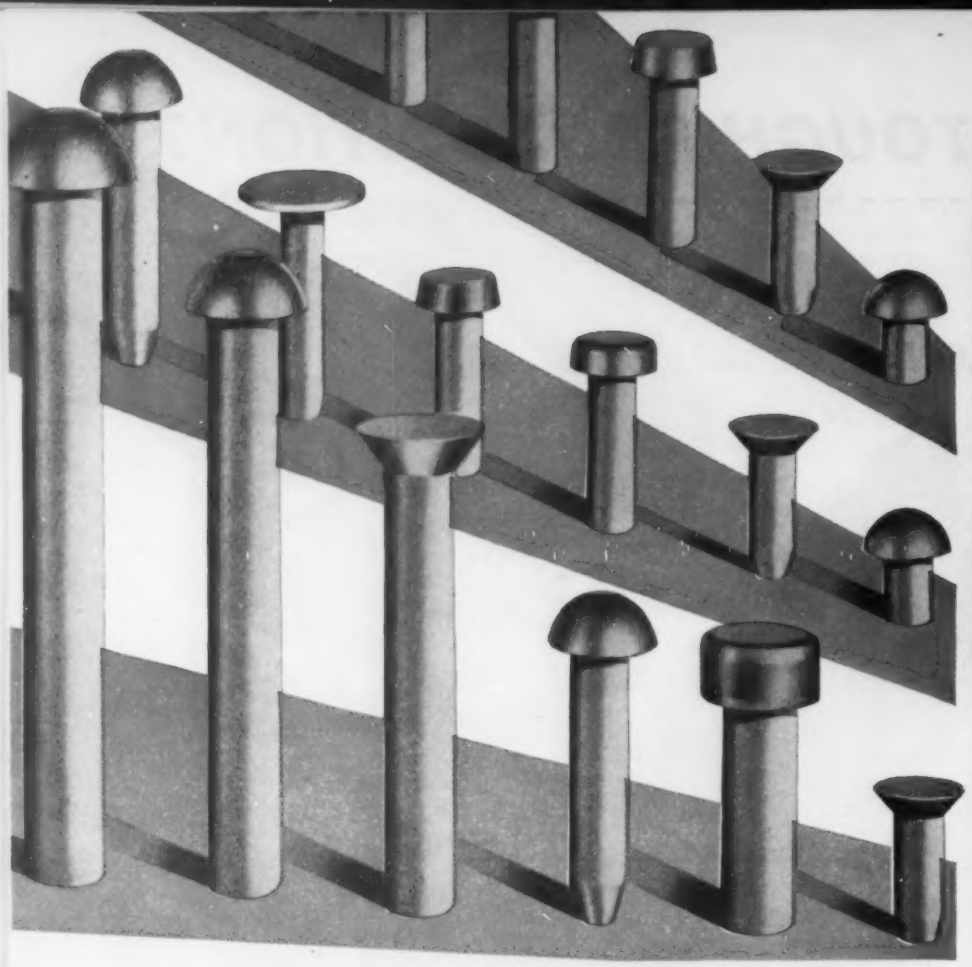


Here's Why Townsend Cold-formed Rivets Drive Easier, Fit Tighter

The ease of driving and tight fit you get with Townsend cold-formed rivets stem from their close size and shape tolerances. Since they are perfectly round, holes can be made smaller for tighter fit —joints seal readily. The shank end is cut off squarely and fits the contour of the driving head evenly. Also, there is less flash under the head than on hot-formed rivets which allows closer fit.

For operations where rivets are to be heated electrically, the square-cut end plus the absence of insulating scale provide better contact and eliminate arcing. For cold-pressing operations, Townsend rivets are supplied in an annealed or normalized state which gives them a uniformly fine grain size and temper—assures ease of setting.

In the construction, shipbuilding, railroad and heavy fabricating industries Townsend rivets, large and small, have been standard for more than a century. In fact, Townsend supplies a wide range of fasteners to every industry that needs to assemble materials quickly, economically, permanently.

As the world's largest manufacturer of a complete line of rivets, Townsend also regularly produces more than ten-thousand standard and special fasteners —makes as many as 60-million pieces daily. This combination of experience, product range and tremendous capacity gives you a dependable source of supply for the correct cold-formed products for each specific use—saves time and money in your operations.

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California

THE FASTENING AUTHORITY—Experience: *over 138 years*—**Capacity:** *sixty-million parts daily*—**Products:** *over ten-thousand types of solid rivets–cold-headed parts–Cherry Blind Rivets–Twinfast Screws–self-tapping screws–tubular rivets–locknuts–special nails–formed wire parts.*

Plants: *New Brighton, Pa.—Chicago, Ill.—Plymouth, Mich.—Santa Ana, Calif.*

In Canada: *Parmenter & Bulloch Manufacturing Company, Ltd., Gananoque, Ontario*

—Personnel—

Roland J. La France, appointed manager, paint sales division, JOSEPH DIXON CRUCIBLE CO.

J. R. Mummert, named Chicago district sales manager, PENN METAL CO., INC., Parkersburg, West Virginia.

B. R. McBath, appointed general European manager, with headquarters at French-Worthing Co., Paris, France of WORTHINGTON CORP.

J. A. Dickson, appointed district manager, southeastern states, Steel Strapping Div., THE STANLEY WORKS, New Britain, Conn.

Milton W. Melander, appointed export sales division manager, STAUFFER CHEMICAL CO., New York office.

Richard B. O'Donnell, named traffic manager, THE ARMCO INTERNATIONAL CORP.

J. Ross Arnold, appointed district manager, Birmingham, Ala., LINK-BELT CO., Chicago.

Maurice M. Clemons, appointed chief engineer, SAHLIN ENGINEERING CO., Birmingham, Mich.

E. H. Peterson, appointed sales manager, MAGNUS CHEMICAL CO., INC., Garwood, N. J.

Joseph L. Hochman, named production manager, SCHACHT STEEL CONSTRUCTION, INC.

Arthur L. Miller, becomes general superintendent, CONTINENTAL STEEL CORP., Kokomo, Ind., succeeding Julian L. Schueler, who has retired. **Donald C. Horsman,** named assistant general superintendent; and **Charles M. Coe,** becomes steel division superintendent. **Herman D. Achors,** named rod mill superintendent.

Robert Edwards, appointed advertising manager, TRAILMOBILE INC., Cincinnati.

Philip C. Wallach, appointed advertising and public relations director, H. K. PORTER CO., INC., Pittsburgh.

H. J. Karakas, promoted to manager, Eastern seaboard sales division, THE PFAUDLER CO., Rochester.

C. F. Kucera, appointed regional representatives for transmission equipment in the Southeast regional offices, ALLIS-CHALMERS MFG. CO., Milwaukee; and **Harold H. Ackmann,** appointed regional representative for transmission equipment in the Central regional offices.

Albert F. Lang, appointed Northern Ohio automotive sales representative, Berger Mfg. Div., REPUBLIC STEEL CORP., Cleveland.

Donald W. Douglas, appointed salesman, CHASE BAG CO., Chicago.

Donald W. Walker, appointed product manager for pig, ingot and billet, KAISER ALUMINUM & CHEMICAL SALES, INC., Oakland, Calif.; A. V. Lorch, becomes assistant product manager, Chicago office, and **Charles B. Wilmore,** named technical specialist for pig, ingot and billet, Cleveland.

Joseph H. Gray, appointed sales representative, Pittsburgh office, HARBISON-WALKER REFRACTORIES CO.

Albert J. Welch, appointed sales representative, Southwestern Pennsylvania, FREDERIC B. STEVENS, INC., Detroit.

R. L. Stuart, named general manager, MELLON-STUART INDUSTRIAL CONSTRUCTION CO., newly-formed subsidiary of Mellon-Stuart Co.

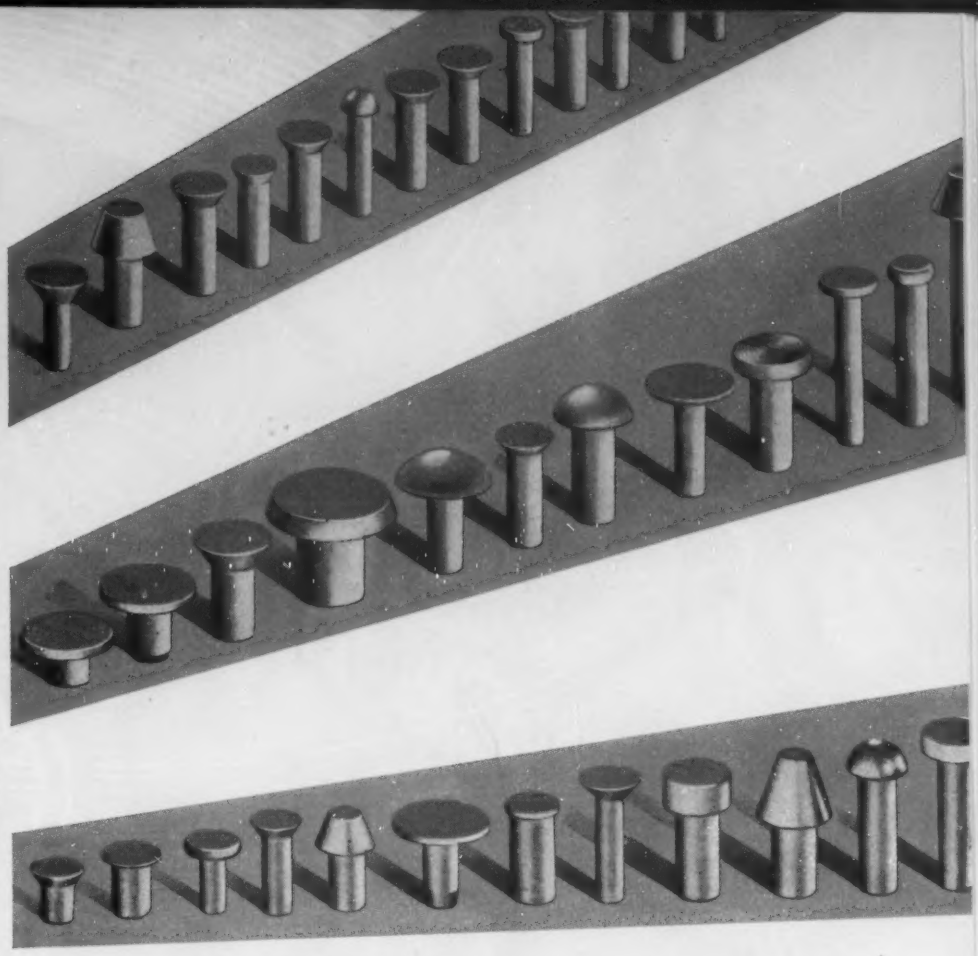
Fred A. Sheridan, appointed sales manager, LAKEY FOUNDRY CORP., Muskegon, Mich.

OBITUARIES

Alexander M. MacCutcheon, 72, former senior vice-president and director, Reliance Electric & Engineering Co., Cleveland, at his home in Orlando, Fla., after a long illness.

Lester F. Nenninger, 59, assistant manager, Machine Tool Division, The Cincinnati Milling Machine Co., and vice-president of its sales subsidiary, Cincinnati Milling and Grinding Machines, Inc., recently.

Herbert L. Bergman, chief erection engineer, Surface Combustion Corp., Toledo, Ohio, recently in Muncie, Ind.



How To Plug Holes In Cost And Design Problems With Townsend Rivets

Economy in production-line assembly of components and simplicity of product design are only two advantages you enjoy when you use Townsend cold-formed rivets. In addition to their low initial cost, they improve your product by making possible tightly sealed joints of great strength and high resistance to vibration.

Townsend regularly produces several thousand styles and sizes of standard and special rivets so that you can readily select from stock the type best suited to your operation. A feature of Townsend service is that small rivets are sold by the piece instead of by the pound, either in packages or in bulk. This means that you no longer need order rivets by the pound and convert the weight into pieces—purchasing and inventory control is simplified. Then too, Townsend distributors and jobbers receive their stocks in standard cases which contain individual boxes packed by actual count. This enables them to give you faster and more efficient service.

To keep costs down and quality up, specify Townsend rivets and special fasteners. We have the capacity to pace your production schedules — you can depend upon us to help keep your assembly lines rolling.

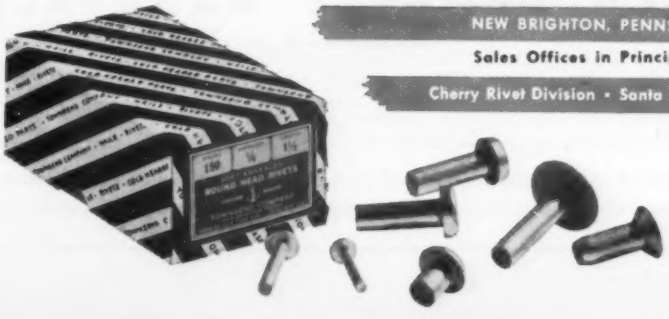
Townsend

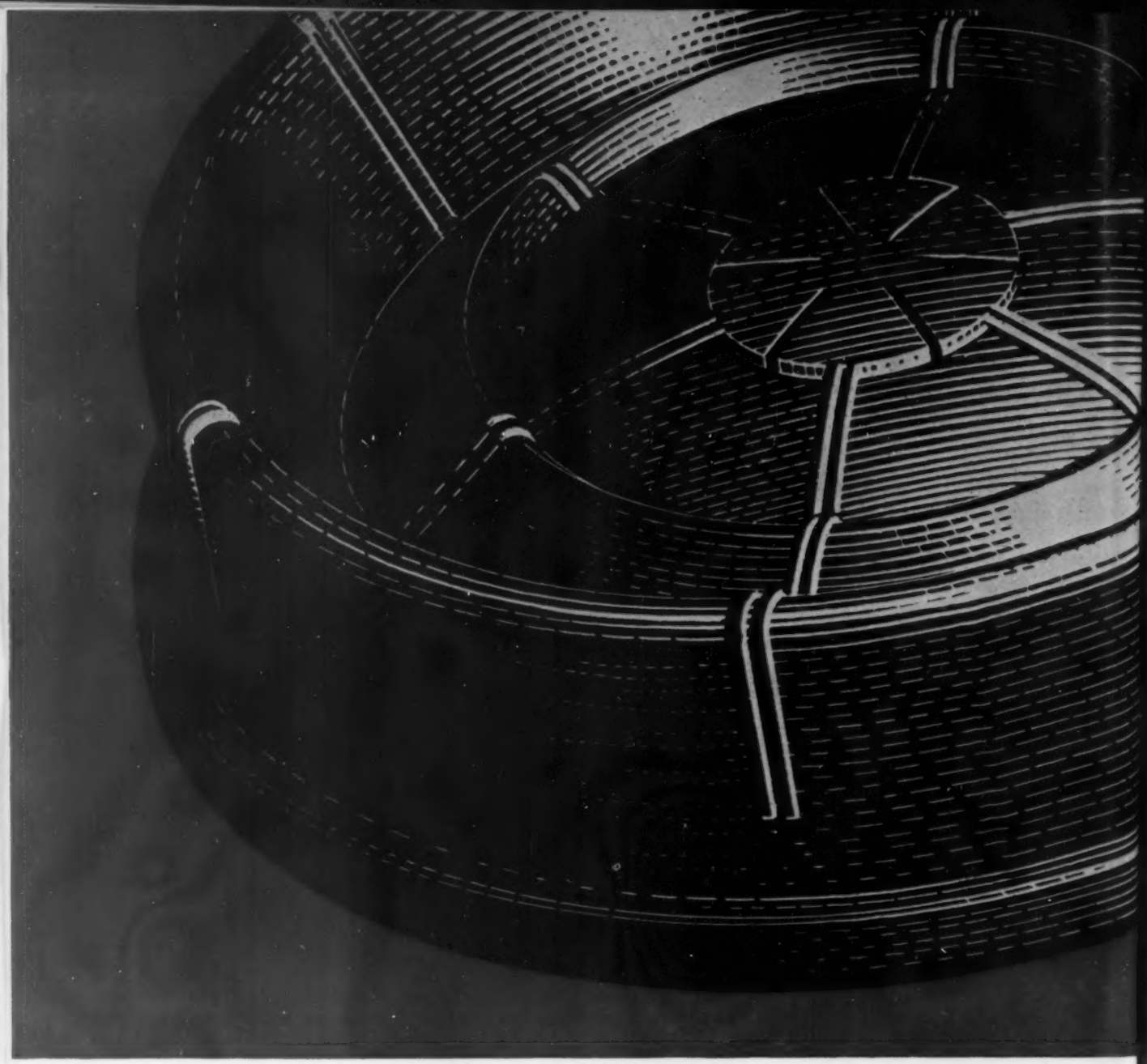
COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California





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Technical Articles

NEW METHODS For Finishing Powder Metal Parts

By Charles C. Cohn
Director of Research and Development
Colonial Alloys Co.
Philadelphia

◆ Field-tested finishing techniques have improved to a point where plated powder metal parts are far superior in corrosion resistance to metal parts plated by standard methods . . . Improvements apply where only corrosion resistance is desired, or where corrosion resistance is coupled with other desired factors such as decoration, electrical contact or conductivity, and solderability.

◆ Thorough cleaning of internal and external porosity is basic to the new method . . . Proper sealing eliminates internal voids . . . The seal is dimensionally stable when subjected to cleaning baths, plating baths, heating procedures, and does not change on aging . . . It is also inert . . . Technique can be used to prepare surfaces for other treatments as organic finishing . . . Any plated finish can be applied.

◆ USE OF METAL POWDERS for producing small parts has grown tremendously during the past few years. A primary reason for this trend has been the many advantages which metal powders offer. With proper finishing techniques, this growth could have been greater. Now, finishing methods have been improved to such an extent that the corrosion resistance of plated powder metal parts far exceeds that of standard plating methods on various forms of metals and alloys.

While many metal powder parts require no finishing, there are many which require it either for protection or decorative purposes. But, unlike other metals, metal powder parts cannot be finished according to standard procedures of cleaning, plating, oxidizing, blackening, phosphatizing, anodizing, chromating or any other type of aqueous treatment. Many difficulties are involved, and numerous materials and methods have been proposed to overcome them.

The chief troubles were attributed to (1) surface porosity, (2) internal porosity, (3) composition and purity of powders, (4) effects of sintering, and (5) effects of foreign matter in the surface or internal structure. Some of these troubles showed up in almost any type of aqueous finishing treatment.

Many difficulties encountered in these early investigations have been eliminated. Materials and methods are now in use for protecting, electroplating, oxidizing, chromating, phosphatizing and anodizing powder-metal parts.

Certain basic steps are necessary regardless

"Powdered-metal parts may be plated with any metal that can be plated on a similar alloy in the form of a wrought or cast part . . ."

of the composition, density, internal or external porosity of the parts. Then, depending on the composition or alloy, specific cleaning and plating baths are employed wherein all internal and surface contaminants are removed and calculated current densities, maximum throwing power and other factors are carefully controlled.

After cleaning, parts are impregnated with a carefully selected resin of high heat resistance, resistant to swelling or shrinking, with high corrosion resistance and little or no water absorption. The impregnation is done with vacuum and pressure for carefully predetermined periods, then washed free of excess resin and baked.

Among the sealants used is a sodium silicate type, with or without metal flours. The metal flours are fillers and commonly referred to as colloidal. Semicolloidal would probably describe them more accurately since they are usually 500-mesh iron and copper powders, usually require agitation in process, and do not exhibit the Brownian movement of true colloids.

Metal powder fillers also offer the risk that particles will filter out of solution and bridge microscopic pores, later to be ruptured under wear and unseal a capillary duct. Sodium silicate itself shrinks on baking, is reactive with some metals and somewhat abrasive so that subsurface residue may injure bearing surfaces when finish polishing is done after machining. However, it has exceptional dielectric properites and tolerates unusually high temperatures and pressures.

Linseed or tung oils are another type of sealant. These, like sodium silicate and its compounds, are baked after impregnation is complete. They are subject to gradual oxidation that may run to complete deterioration in time.

A strong trend has been toward the resin and resin-oil combinations such as styrene with linseed oil or dehydrated castor oil. These are thermosetting compounds, varied in properties and in the incidence and type of volatile and resin constituents, resistant to temperature changes, solvents and chemicals.

Air-setting compounds tried

A fourth type are the new compounds which are air setting and require no baking. Many, but not all, of the linseed and tung oil types and the resin-styrene compounds are described as 100-pct solids in true solution which suffer no shrinking during drying or curing.

The best impregnants are generally those of low viscosity, preferably of low volatility, which dry or cure to solid infusible materials with little or no loss of volume. They should tolerate temperatures of 300°F, and have no effect on machinability of the impregnated part.

Impregnation has been practiced by five methods. The oldest of these is done in a pressure vessel. The obvious flaw is that the impregnant, under pressure, compresses air in

Roundup of Earlier Finishing Methods

Along with the growth of powder metallurgy has been the development of various processes for finishing powder metal parts, including:

Treating parts with a colorless thermosetting resin, then catalyzing with a peroxide and subjecting to heat to set. Parts were then solvent cleaned.

Porosity of sintered iron parts was impregnated with molten metals to increase corrosion resistance, density, and static as well as dynamic strength. This was also a preliminary step to plating.

Electroplating metal powder parts by plating the compact before, or before and after sintering. After plating in cyanide bath, treatment with oxalic acid or weak sulfuric acid was indicated.

Nickel and copper plating in sequence for subsequent alloying by sintering or heat treatment. Purpose was to get good adhesion and corrosion resistance.

Electroplating powdered-iron parts with nickel for low electrical contact resistance. Process involved annealing which volatilized residual salts trapped within the internal or surface porosity.

Heating parts in air at 400°F, quenching in a 96-pct solution of carbon tetrachloride or perchlorethylene containing Dow-Corning Silicone Compound No. 200, then drying and baking at 400°F for 30 min. Parts were then pickled, prior to plating, plated, washed and dried.

Chrome plating on powdered brass parts featured a base plating of copper, accompanied by a carefully controlled cleaning cycle.

Peen plating by tumbling powder metal parts with an agent to give added pressure. Operation made surfaces more dense and more uniformly plateable.

microscopic holes or capillary passages. After decompression, air will force the impregnant out of some pores, and to that extent defeat the purpose of impregnation. Even though small bridges of solid impregnant cover other pores, they may rupture in service.

In the internal pressure method, sizeable compacts are sealed off except for a single port. Impregnant is introduced and pressure applied at the entrance port. Pores and capillaries are thus filled from the inside outward. This method is expensive because of the preliminary sealing involved and suffers the same post-treatment hazards as the first method.

External pressure by batch immersion suffers the same disadvantages as the first method, but treats more parts at less cost per unit.

Another method is vacuum impregnation by batch immersion, followed by pressure. This method is applicable equally to large pieces when equipment of practical size will permit only one at a time to be handled in trays or baskets.

Sodium silicate seals compacts

Vacuum alone is used in a process by which all ports are sealed with a vacuum connection at one port. The compact is submerged in the sealing compound and vacuum drawn to pull the sealant through the walls from outside to inside.

Government agencies do not recognize the first method. Of the other four methods, internal pressure and vacuum impregnation are preferred. The first three methods merely seal the openings, creating the risk that service wear, corrosion, or electrolysis, with some impregnants may expose new defects.

The production of pressure-tight or leakproof compacts is often difficult because of design. Impregnation with a suitable sealing agent will usually salvage compacts that do not pass the initial pressure test. The type of impregnant depends upon the substance that the compact is required to hold.

Suitable impregnants include sodium silicate, styrene, tung oil, linseed oil, phenolic resin, drying oil resin plus certain proprietary brands. Sodium silicate is used extensively, with or without pressure, to seal compacts either singly or in batches. When treating one compact at a time, all openings except one are closed and the compact filled with the sealing fluid. Then a fitting is attached to the remaining opening and an air pressure of at least 10 psi applied.

The operation is facilitated by heating both the compact and impregnant to 150° to 200°F. Pressure and temperature are maintained until seepage occurs or the leak is stopped. In the batch process, compacts may be immersed in a suitable tank containing the impregnant maintained at a temperature of 150° to 200°F. A pressure of from 50 to 100 psi may be used to assist the capillary action to draw the sealing fluid into the pores of the compact.

As a rule, an immersion time of 2 to 6 hr is sufficient. In both processes, the sodium silicate is mixed with water in proportions varying from one part sodium silicate to five parts water to about four parts sodium silicate to one part water. The concentration depends upon the requirements of the particular compact. After satisfactory impregnation, the compact is drained, washed thoroughly in hot water and then heated to 212° to 220°F for 1 to 2 hr.

Powdered-metal parts may be plated with any metal that can be plated on a similar alloy in the form of a wrought or cast part. Type and thickness of plate are not changed. Other factors of powder metal parts are different from wrought or cast parts. The most important differences are in internal and surface porosity, internal and surface structure, greater actual plating surface area, and difficulties in rinsing and cleaning.

Wherever possible, it is preferable to use acid-type plating baths since acid entrapment is less likely to cause subsequent trouble with the plated coat than alkali residues. Alkali entrapment causes subsequent swell, thereby

PLATING RESULTS COMPARED

	Powdered Iron			Carbon Steel		
Factors	Copper and Nickel	Cadmium	Zinc	Copper and Nickel	Cadmium	Zinc
Abrasion	10	10	10	10	10	10
Corrosion	200	200	200	10	10	10
Stress Cracking	15	15	15	10	10	10
Porosity	10	10	10	10	10	10
Grain size	10	10	10	10	10	10

Figures are comparative factors with 10 indicating standard conditions obtained on the above platings on low-carbon steel. Higher numbers indicate superior plate.

IMPROPER FINISHING TECHNIQUES CAUSE—

- Excessive dragout of cleaning and plating solutions.
- Difficulty in rinsing out internal entrapment.
- Disappearance of plating by migrating into porosity.
- Peeling of deposited plate.
- Entrapment of cleaning, pickling and plating solutions.
- Internal or surface galvanic corrosion.
- Flowering of deposited plate.
- High costs.
- Poor corrosion resistance.
- Inability to maintain decorative plated finish.

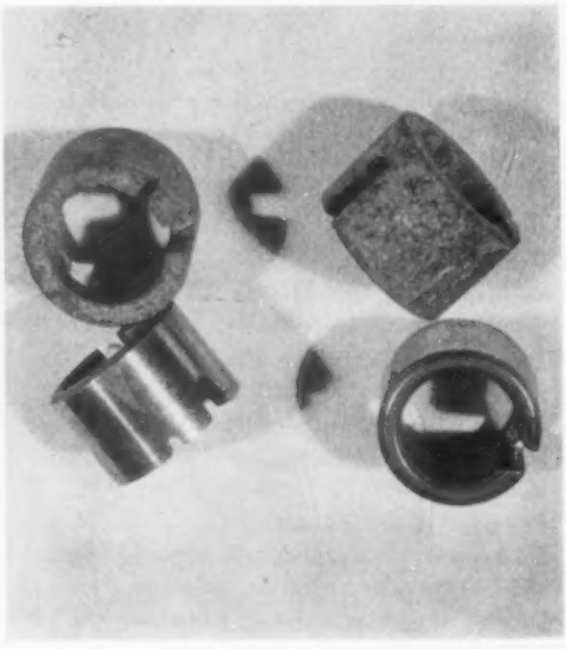
Finishing techniques apply to all powder metal alloys regardless of the plate desired . . .

creating expanding pressure and lifting the plated film.

The sequence of plating, as in plating other forms of metals and alloys, depends on the basis metal and the requirement of the plated finish. Some finishes specified for corrosion resistance require a cadmium or zinc-plated surface. Others which require solderability might specify tin. Other finishes for decorative value might require a chrome-plated finish using copper, nickel, or other baths before the final chrome plate.

Silver is sometimes specified for electrical contacts, or copper for electrical conductivity, or brass for rubber adhesion, or anodizing on aluminum for protection or decoration. Throwing power in all baths is important, particularly in barrel-plating operations. Current-density regulation is also important. The tendency is to underestimate the actual surface area of powder metal parts with the result that they do not get enough current. Selection of the initial plating coat is important to reduce the natural high electrical resistance of powder metal surfaces.

Standards for salt-spray corrosion resistance on plated powder metal parts have been made very low by necessity in spite of attempts to improve the plating. Both government and industry have had to lower their salt-spray requirements on many powdered-metal components. An example is a powdered-iron part of strategic importance which was classified for 196-hr salt-spray resistance. Because platers were unable to accomplish this corrosion resistance, the requirement was lowered to 24 hr.



PARTS IMPREGNATED by conventional techniques (top) and cadmium plated failed after 24-hr salt-spray exposure. Similar parts (bottom) finished by new techniques withstood 572 hr.

A contract plating shop in Philadelphia has been able to break this corrosion resistance bottleneck by plating these powdered-iron compacts so that they withstand from 300 to 700 hr of salt spray, depending on the plating sequence used. This is at least 20 times better than that obtained previously by standard methods. More than a million of these parts have been plated with cadmium to this high specification without a single reject due to plating.

The techniques apply to all powder metal alloys and all types of parts regardless of the plating finish desired. For example, cadmium, zinc, tin, nickel, copper, silver chromium and other finishes can be applied. No elaborate or costly steps are involved. The finished plate is similar to that on steel, copper, brass and other wrought or cast parts.

Another feature of this technique is that impregnation can be done without the necessity of plating. This eliminates internal porosity and corrosion, and presents a surface for other treatments such as organic finishing. Selective impregnation can also be done to any area of a part. By selective impregnation and selective plating any internal and external area of a part can be sealed.

Density affects plateability

The density of a powdered-metal part has a bearing on its plateability. The more dense the internal area, the less porosity and therefore the better plating results. A study of the relationships of density with tensile strength, elongation, yield, impact, structure, carburizing, tolerances and surface finishes shows that electrolytic-iron powder gives much better all-around factors than ordinary powder. It attains a density of 7.46 to 7.7 g per cc, depending on the after-treatment of the green compact.

The surface finishes have a bearing on plateability and depend on factors other than high density. The hardness of die and punch surfaces are important. For best results, die surfaces should be carbide. Punches are preferably of 5-pct vanadium type tungsten high-speed steel, or a 12-pct chromium air-hardening steel.

A study was made to determine whether plated deposits on powdered metals had different characteristics from similarly plated metals on other basis metals. For comparison, powdered iron was used as the basis metal in the one case and low-carbon steel as the comparative basis metal.

The metal platings selected were copper and nickel, cadmium, and zinc. The factors for comparison were: abrasion resistance, corrosion resistance by salt spray and outdoor exposure, stress-cracking, porosity, and grain structure.

Air makes the change—

Bore Heavy Tubing Faster on New Trepanning Lathe

◆ HEAVY WALL TUBING is bored out faster on an unusual trepanning lathe developed at The National Supply Co. and in use at the company's Torrance, Calif., plant. Adequate spindle horsepower, a high spindle-speed range, and high cutting fluid pressures and volumns, were sought by plant engineers in designing the lathe. A key feature, a speed increasing device, permits quick shift between low and high speed ranges.

The lathe is used in the industrial products division of the plant for work requiring high speed, deep hole, precision boring. Penetration rates in excess of 4 ipm on a 5½-in. diam hole, 26 ft deep, are commonplace. Holes up to 8⅞-in. diam in lengths over 40 ft, have also been successfully trepanned at the Torrance plant. For a normal setup, workpieces up to 50 ft long, may be trepanned.

In trepanning operations a hole is produced by removing a core. The trepan head, a cylindrical device with cutting tools projecting axially from the face at one end, is attached to a tubular boring bar of appropriate length, which drives into the revolving workpiece, producing an annular groove. The width of the annular groove and the wall thickness of the boring bar are such that two annular spaces are formed—one between the outside of the boring bar and the inside of the hole of the workpiece and the other between the inside of the boring bar and the outside of the core.

Cutting fluid, under high pressure, enters through a gland, sealing against the side of the workpiece. Moving between boring bar and inside hole diameter, the cutting fluid picks up chips and flushes them back between the boring bar and the core. Chips are caught in a container at the discharge end of the boring bar, and the coolant returns to the sump.

Power from a 150 hp variable speed direct motor is transmitted to the headstock and workpiece through a two-speed gear box and a 25 V-belt drive. In the high-speed range, 250 to 1000 rpm, the motor is coupled thorough the gear box in direct drive to the driving pulley. For low speeds, 70 to 280 rpm, power is transmitted to the driving pulley through helical gearing in the gear box.

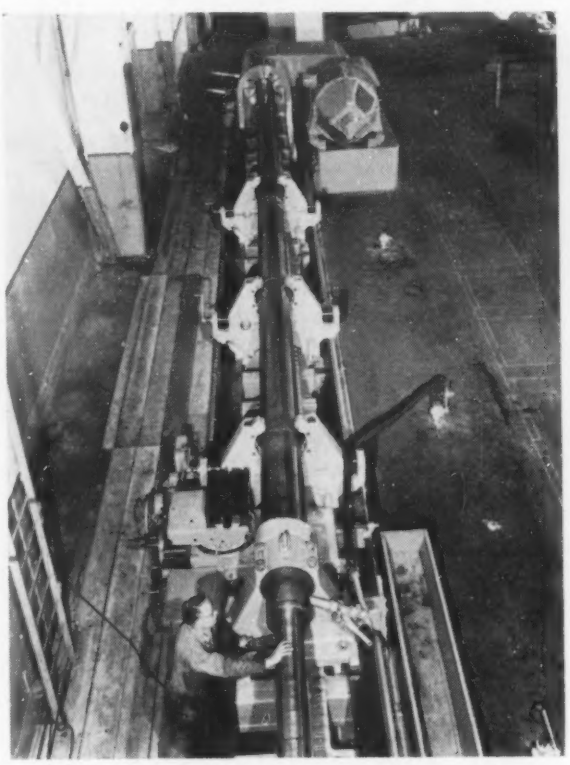
An air-actuated cylinder in the gear box, controlled by the operator, makes the shifts between high-speed, low-speed and neutral positions.

Spindle and spindle pulley, an integral unit, is carried in two tapered roller bearings—a double row at the chuck end and a single row at the opposite end.

A quick-acting, self-centering steady rest facilitates centering the workpiece with the spindle axis. Two opposing jaw elements, employing a common adjusting screw with right-hand and left-hand threads, center the workpiece. Each jaw element carries four ball-bearing rollers—two below for support and two above to restrict.

Cutting fluid is delivered from a 2000-gal sump by a four-stage centrifugal pump. The pump is located in the basement.

Trepanning has found its most practical application in the field of thick wall tubing manufacture.



DEEP-HOLE PRECISION BORES have been made successfully up to 8⅞-in. diam and in lengths over 40 ft. This 41-ft shaft is being bored to a 3½-in. diam by trepanning.

For 400-Series—

Test Determines Presence of H

◆ Type 410 stainless steel can be tested to determine whether stresses are high enough to cause cracks in subsequent service . . . With some modification, it may be usable for similar or related alloys . . . Conversely, the test can help to determine proper heat treatment.

◆ Hydrogen selenide, formed by reaction of selenium dioxide and hydrochloric acid on 12-pct Cr steel, speeds crack formation if high stresses are present . . . Cracks are easily identified by Magnaflux inspection . . . Degree of stress is determined by study of exposure time and temperature of solutions.

By Hyman Kirtchik
Analytical Unit Engineer
Aircraft Gas Turbine Div.
General Electric Co.
Evendale, Ohio

◆ A POSITIVE TEST has been developed for Type 410 stainless parts to determine whether stresses, other than residual stresses, are high enough to cause cracks in subsequent service. The method is an adaptation of tests on Type 410 compressor blades for jet engines. Use of this method can probably be extended to similar or related alloys. It can also aid in determining proper heat treatments to relieve stresses.

Stresses other than residual stresses may enter into finished products due to a particular mechanical treatment. This study was concerned with stress corrosion or hydrogen embrittlement which may be synonymous terms.

Purely chemical or electrochemical attack is accelerated if mechanical stress is exerted on a material. That susceptibility is definitely diminished by annealing procedures which relieve mechanical stresses. Whether any particular material is sensitive to stress corrosion cannot be answered readily. A material has a certain tendency toward stress corrosion, and frequently this tendency only shows in combination with certain corrosive agents, which in themselves may be thought of as innocuous.

The susceptibility is frequently increased by a thermodynamic instability of the alloy due to supersaturation. This is true for ferritic steels since a correlation between sensitivity to elongation aging and caustic brittleness is apparently due to a nitrogen supersaturation. This supersaturation does not necessarily show in an occurrence of segregations because homogeneous thermodynamically-stable alloys can show stress corrosion. An explanation of cracking, on the basis of heterogeneities in the material wherein anodic and cathodic points are locally fixed, is that in a completely homogeneous structure attack can be produced by potential differences between the chemically-different atom types of the solid solution.

Another explanation is that since the speed of corrosion is a function of time, erosion is presumably not only produced by oxygen diffused into a metal, but also by oxygen absorbed on the specimen. Still another school of thought is that the absorption of hydrogen in the metal, leading to local areas thermodynamically unbalanced, causes the corrosion manifested by cracking.

Stressed parts respond positively

Notwithstanding another theory which states that chemical attack can occur without internal stress, the safest summarization is that attack takes place only if mechanical stress is exerted on the metal. This is based on the assumption that potential shifts occur as a consequence of mechanical stress. These shifts cause certain parts of the structure to be electrochemically less noble than others, thus initiating an otherwise not occurring corrosion process.

In an internal application, unstressed parts did not crack in the field and responded negative to the testing procedure. On the other hand, purposely stressed parts simulating a faulty

High Residual Stresses in Stainless

manufacturing practice always responded positive. These parts, after annealing again, responded negatively. The heat treatment may be thought of as relieving the condition of any of the above theories with equal merit.

Typical cracks occurred in Type 410 stainless compressor blades which were manually ground at the edges with pressure. Depending on the pressure applied and the temperature ensuing, more or less stress could be introduced into the blade.

Sulfide sulfur accelerates the formation of cracks if stress is present in this type of material. It was therefore reasoned that selenide would hasten this formation at a rate suitable for repetitive testing. A solution of selenium dioxide and hydrochloric acid was used successfully in checking for the stress condition.

Hydrogen selenide promotes cracking

Unique in the test is the reaction with the 12 pct Cr steel in which some hydrogen selenide, H_2Se, is generated and promotes quick development of cracks if excessive stress is present. Such cracks are easily identified by Magnaflux inspection. With further study of time of exposure and temperature of the solutions used, a determination can be made as to what constitutes a dangerous high internal stress condition which will cause cracking during operation.

Acids, bases and salts generally attack a stressed metal more readily than the annealed metal. Original corrosion studies with Type 410 stainless were done with neutral salts and acid solution. It is no problem to initiate dissolution of this material, but choice of etchant was directed toward attacking the stressed areas, if present, with little if any solution of the whole metal. This is important because dissolution acts to stress relieve. Thus, if attack is rapid, cracks will not show even if stress is present.

Original work to bring out cracks was done with an inhibited mixture, consisting primarily of phosphoric acid and alcohol. If the suspected part was placed in the hot solution and continuously saturated with hydrogen sulfide gas, H_2S, cracks may appear after prolonged periods. However the temperature at which the solution must be used led to a change in concentration and volatilization of an organic constituent. Also, the time element is extensive.

Results reported by others were inconclusive because of the destructiveness of the test. It was possible to duplicate this work by using only dilute phosphoric acid and hydrogen sulfide. The mechanism of bringing out cracks on the compressor blade material was established as the reaction of an acid solution plus the promotion by the hydrogen sulfide. The phosphoric acid, by the deposition of phosphate, acted as a self-inhibitor.

This work was directed toward a similar end with the added requirements of shorter time and positive identification of only stressed material. Accordingly, mixtures of hydrochloric acid, HCl, and selenium dioxide, SeO_2, were used. The original reaction of dilute HCl with the Type 410 blade is the liberation of free hydrogen. In solution, the selenium dioxide combines to form selenious acid, H_2SeO_3. The liberation of hydrogen may be considered to react

DESIGN CONDITIONS FOR ETCH TEST

			No. of Blades	Number of Cracks Found
S_0	C_1	T_1	2	3, 2
		T_2	2	6, 5
		T_3	2	0, 1
	C_2	T_1	2	1, 8
		T_2	2	10, 1
		T_3	2	0, 1
	C_3	T_1	2	3, 0
		T_2	2	3, 4
		T_3	2	8, 10
S_1	C_1	T_1	1	4
		T_2	1	3
		T_3	1	5
	C_2	T_1	4	6, 18, 3, 2
		T_2	4	19, 2, 0, 0
		T_3	4	8, 11, 10, 9
	C_3	T_1	4	7, 4, 4, 0
		T_2	4	22, 1, 2, 3
		T_3	4	6, 4, 21, 13
S_2	C_1	T_1	2	2, 1
		T_2	2	2, 2
		T_3	2	1, 2
	C_2	T_1	2	2, 0
		T_2	2	many, many
		T_3	2	many, many
	C_3	T_1	2	6, 4
		T_2	2	0, many
		T_3	2	many, many
S_3	C_1	T_1	2	0, 0
		T_2	2	0, 0
		T_3	2	0, 0
	C_2	T_1	2	0, 0
		T_2	2	2, 0
		T_3	2	0, 0
	C_3	T_1	2	0, 0
		T_2	2	0, 0
		T_3	2	0, 0

Stress
S_0—Half Burned Blades
S_1—300 F Anneal of S_0
S_2—600 F Anneal of S_0
S_3—900 F Anneal of S_0

Acid Solution
With 1 pct SeO_2
C_1—HCl (1 to 4)
C_2—HCl (1 to 1)
C_3—HCl (7 to 3)

Time at Room Temp. 65° to 70° F
T_1—20 min
T_2—40 min
T_3—60 min

What's Involved in Testing

Key Points to Watch—

Depending on stress level, cracks can be identified visually.

Visual absence of cracks does not necessarily mean a blade has no cracks.

Examine for cracks by Magnaflux procedure. After this test, discard blade from further use.

Keep record of test, i.e., number of samples, location and number of cracks, immersion time and date of test.

Checking the Solution—

To be certain that the HCl plus SeO_2 solution is satisfactory:

Use test strips, measuring 0.065 x 0.5 x 12 in., of 12-pct Cr steel, heated to 1750°F and air cooled.

Test strips are to be held under stress in racks. Grind strips to length for proper deflection, then round ends to insure point loading. Deflect strips about 0.80, 1.20 and 1.60 in. to produce stresses of about 50,000, 75,000 and 100,000 psi in outer fibers of center portion.

To approximate bending stress, use this formula:

$$\text{Bending stress} = \frac{thE^2}{2l^2}$$

where t = thickness of material, in.
h = height of deflection, in.
E = modulus of elasticity, psi (usually 3×10^7)
l = length of strip

Immerse specimens on rack in test solution and after 30 min examine by Magnaflux.

Do not remove specimens from rack for Magnaflux examination unless cracks are visible to the eye.

Remove Ultrasene from racks with suitable solvent before returning them to test solution.

How to Examine by Magnaflux—

Use longitudinal magnetization, passing 1000 amp through a coil of eight turns.

Throughout the test, use the continuous method with suspension of 2.5 pct black Magnaflux paste in Ultrasene by volume.

If cracks appear after 15 min, reject blades.

For quality control in production, immersion time in stress-corrosion tests is to be 4 hr.

Testing a Blade—

Under a good hood, dip the blade into a solution of defined concentration and temperature, and for a specified time.

Examine the blade visually and by Magnaflux for cracks at the edges.

What Reagents to Use—

Distilled water.
Hydrochloric acid, 37 to 39 pct, specific gravity of 1.19.
Selenium dioxide, SeO_2, C.P. or U.S.P.

How to Prepare Test Solution—

Mix equal amounts of water and hydrochloric acid. To this mixture, add selenium dioxide in the amount of 10 g per 1000 ml, or 1.3 oz per gal. The solution is stable and should be stoppered.

Selecting Samples—

After annealing, remove all scale by tumbling or polishing the completed blades.

Facilities Are Needed For—

Maintaining test solution temperature between 65° to 75°F.

Removing hydrogen selenide fumes with a ventilated hood.

Water rinsing, and manual sponging and wiping of blades.

Identifying cracks by Magnaflux procedure.

Degreasing and water cleaning blades before testing.

Step-by-Step Procedure—

Remove external dirt and oil from blade by degreasing, water rinsing, then wiping dry.

Place blades in solution held between 65° and 75°F for total time of 4 hr. As a guide, use at least 1000 ml, or 0.25 gal, for each eight blades.

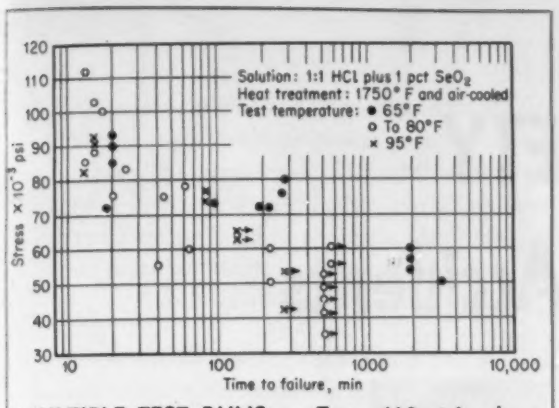
Remove blades after 15 min, 1 hr and 4 hr immersion time and inspect according to procedure.

After removing blade, rinse it in running water for 15 to 30 sec.

Sponge off superficial red surface and rinse in running water for another 15 to 30 sec. Wipe dry.

If solution is used in recommended capacity, discard it after 4 to 6 hr.

with the selenious acid. The selenium precipitates in the etching bath as the voluminous red colloidal form. An important by-product is hydrogen selenide in small amount from the nascent hydrogen. In solution, the compound would exist as hydroselenic acid.



MULTIPLE TEST RUNS on Type 410 strip show the "paint-brush" plot resulting from temperature variations, stock differences and time lag.

The HCl, Se and H_2Se have important functions. After the initial reaction between the metal and the hydrochloric acid, the selenium completely coats the material and acts as an excellent inhibitor against further acid attack. On the basis that sulfur promotes faster corrosion, the selenium, because of its relative position in the periodic table of elements, would have a reactivity far in excess of the sulfur. The hydrogen selenide in solution should act at a more rapid rate on areas of high stress, manifesting itself by the production of a crack.

After determining the mechanism and ingredients of a proper solution, the proper time, operating temperature, and actual concentration of reagents in the final solution had to be established. The final choice, by requirement, must determine the presence of high stress in bad material, and at the same time avoid any possible secondary effects in good blade material.

A factorial-design experiment was conducted on batches of Type 410 blades purposely given a severe hand-polishing treatment to introduce high residual stresses on part of the blade edge. Conditions for the experiment are in the Table.

In this way, blades contained both stressed and unstressed areas to compare or evaluate results of the etchant. Blades were given three different annealing treatments, then treated for three different time intervals in three different concentrations of hydrochloric acid. The concentration of selenium dioxide was 1 g per 100 ml of solution. Temperatures of solutions were held at 65° to 75°F. Cracks on the blades were examined by Magnaflux inspection.

This experiment, using hydrochloric acid solution of 1:1 concentration with 1 pct SeO_2, gave the most uniform and discriminating results without causing extraneous cracks found at the higher concentrations. Also, the time factor was not critical between the limits used.

Liberated hydrogen selenide attacked the stressed portion of the metal causing cracks while the diluted acid acted only as a carrier. This was demonstrated later with test strips which showed little reduction in thickness after similar exposure. A 900° to 950°F anneal relieved the blades of high residual stress, and acid attack would not produce cracks for hours.

It appeared that long exposure to acid attack might introduce secondary reactions which would cause cracks without the presence of high residual stress. Accordingly, five good blades which showed no cracks by Magnaflux inspection were exposed to the solution for various periods of time. In effect, the conditions of S_3 and C_2 were used while the time was varied.

Between 0 and 45 min, the acid solution of 1:1 HCl plus 1 pct SeO, does not affect the original conditions of stress level in the blade material as manifested by cracks. As a corollary, the assumption is that cracking is a function of stress, time and solution. The logical sequence to these findings was the controlled etching of compressor blade material in the chosen solution by the introduction of known stress levels.

Test method allows variation

Known stresses in the material were obtained by using Type 410 strips 12 in. long, ½ in. wide and 0.065 in. thick. By placing these strips in a rack with adjustable stops on one end, arcs of varying height were obtained. The test strip then contained a stress calculable by Euler's Column Equation; i.e., stress is a function of deflection.

Strips containing the induced tensile strength were then placed in 1:1 HCl solution containing 1 pct SeO_2 and allowed to remain until they broke. There would be a short time lag between the development of a crack and the actual breaking of the strip into two pieces. Multiple runs were made on the Type 410 strip, heat treated at 1750°F and air-cooled. A "paint-brush" plot resulted from variations in temperature between 65° to 70°F, slight percentage changes in the raw stock used and the time-lag effect. To be within the safest limits for a field test, the 15-min interval was projected onto the curve and a conclusion drawn that blades with less than 70,000 psi residual stress would be suitable for operational use.

By varying conditions, a test method can be derived to fit the particular problem. Application to other types of materials is very probable. Conversely, the test method can be used to measure stress levels in materials subjected to difficult mechanical or heat treatments.

Acknowledgment

The author acknowledges the excellent cooperation received from Messrs. S. Gootman, W. E. Jones, D. Preston and P. L. Teal on the metallurgical and chemical phases of this development.

Lowers costs, too—

PLANNED SAFETY Reduces Press Accidents

By C. E. Meldrum
Assistant Superintendent
Brown-Lipe-Chapin Div.
General Motors Corp.
Elyria, Ohio

◆ GREATER SAFETY for punch press operators has resulted from a comprehensive safety, methods and tool engineering program at Brown-Lipe-Chapin Div. of General Motors Corp., Elyria, Ohio. Many of the safety methods adopted have permitted higher production rates and lower production costs.

Not a single lost-time accident was incurred on a punch press during a recent 12-month period at the Elyria plant. This result stems from a thorough study of press operations involved in producing parts ranging from hood ornaments to front-end grilles for automobiles. The study first located hazardous operations, then took steps to eliminate those hazards by: (1) use of mechanical loading and unloading devices; (2) standardization of die design for safety purposes; (3) improved safety guard design.

To prevent accidents involving loss of fingers or thumbs, operations must be performed so it is neither necessary nor possible for operators to get hands or other parts of their bodies between pinch point areas in punch press dies. Operations were examined to determine the feasibility of using safe and efficient mechanical loading and unloading devices. A safety check sheet was developed to facilitate locating hazardous operations. Histories of all lost-time press operations were reviewed to determine each accident cause.

With these, presses can be run at maximum strokes per minute without exposing the operator to danger.

Loading and unloading devices at Brown-Lipe-Chapin include hand operated, gravity and power operated slide feeds, automatic coil feed, unloaders, conveyor feed and automatic removal. Proven safety and adaptability to specific applications are important in selecting equipment.

Hand operated slide feeds permit parts to be loaded outside the danger zone and then pushed by hand to the point of operation. This type feed is used for the draw operation on a radiator grille molding. Before the feed was installed, a cage type guard was used.

A hand operated slide feed was attached to this die. Safety was improved because the opening in the cage type guard could be decreased to the thickness of the slide. The smaller opening restricts hand entrance to the die area.

Production was increased because several blanks could be held in the operator's hand before placing them directly into the feeder. With pliers, only one blank could be handled. The feeder positions the blank automatically against locators on the die. With pliers it was necessary for the operator to position the blank against the locator.

Slide guides parts to die

The gravity type slide feed is simpler and cheaper than hand or power operated slide feeds. Attached directly to a die, it guides parts into the die. The slide is shaped to hold parts in the proper location for entry into the die. Its application is limited to parts that will slide easily and locate in a die.

This type feed is safest if used in conjunction with a cage guard which has an opening large enough for the part but too small for fingers. If the opening must be large, the operation can still be safe if the operator must be at arm's length from the danger zone to operate the press.

A typical gravity type slide feed is used for forming bumper-guard anchor plates. Before

◆ Better press methods and improved safety devices can sharply reduce punch press accidents . . . That's the experience of one Midwest plant where a thorough and effective safety engineering program paid off in complete elimination of punch press accidents in a recent 12-month period . . . Safety considered in die design.

◆ Wider use of mechanical loading and unloading devices, standardization of die design and improved safety guards were important factors in eliminating accidents . . . In many cases improved methods and equipment permitted higher production and lower costs.

addition of the slide, the operator inserted each blank with a pair of pliers. The operator now slides blanks through the small cage openings.

Power operated slide feeds using air, installed on bumper-guard trim presses, have proved 100 pct safe. Previously a sweep guard was used with a cage guard.

Use nest for feeding

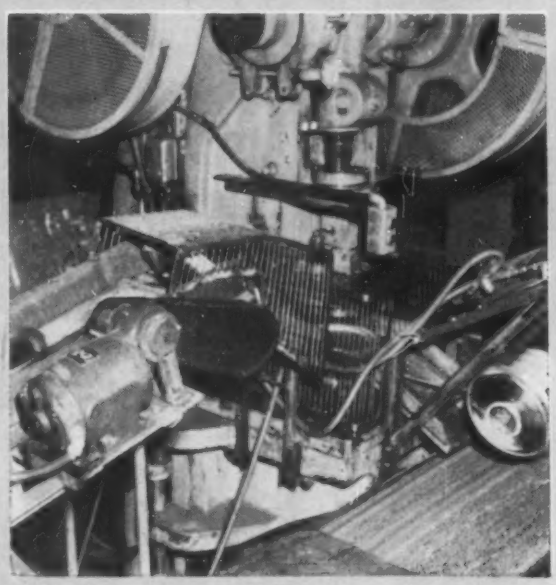
With a power operated slide feed the operator places the part on a nest which holds the part in position for entry into the die. He must use both hands to press slide operating buttons. These actuate an air cylinder which pushes the part onto the die. The press cycle is started by switches so positioned that the slide depresses them when the part is properly located on the die. If the operator removes either hand from a slide operating button before press operating switches are depressed, the slide will return to starting position and the press will not cycle.

After the press ram has gone past bottom center, the operator removes his hands from the buttons and the slide returns with the completed part. The scrap is blown out of the rear of the die onto a chute and drops into a scrap bin.

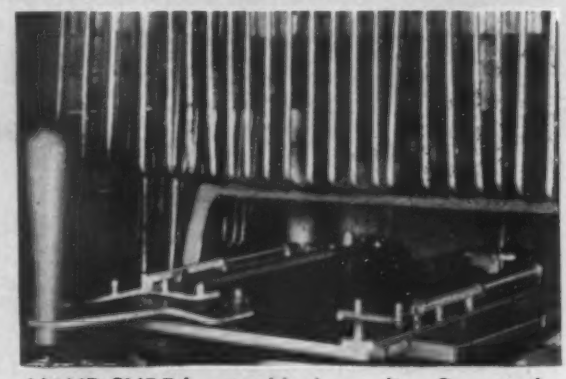
With a magazine type feed several parts are stacked in a specially designed holder and mechanically fed into the press from the holder. There is no necessity for an operator to place any part of his body between dies. The feeder can be synchronized with the press. While the magazine is unloading, the operator may be busy at another operation.

A typical magazine type feeder is used on a press operation for an automobile hub cap body. The feeder, attached to the front of a Bliss No. 28 punch press, is loaded with flat, 11-in. diam blanks of 0.028 in. cold rolled steel. As the

ANCHOR PLATE AND NUT are loaded on indexing table, then move to the weld position. Table then moves to unload position where arm with magnet picks up assembly.



HUB CAPS are fed into this press from belt at left. As hub cap drops into die, electric-eye control causes press to operate. As the ram moves upward, hook removes hub cap.



HAND SLIDE locates blanks on die. Operator's left hand operates slide, right hand presses control button. Hands cannot pass through guard.

Mechanical unloaders, widely used for removing parts from punch presses, aid safety . . .

starting lever is depressed, the feeder slide advances and locates one blank on the die. When the feeder retracts and is clear of the die, it engages the press operating lever. At the end of the press cycle, the completed part is ejected by air through an electric-eye beam. When the beam is broken, the operation is repeated.

To prevent die breakage due to two blanks being fed at one time, the feeder slot, through which blanks pass, is less than the thickness of two blanks. Satisfactory feeder performance requires that blanks be flat, free of burrs, and of constant thickness.

About 1000 blanks, enough for a 1-hour run, are loaded on this feeder. To compensate for decrease in weight of the feeder as blanks are used up, an air cylinder applies constant pressure to the stack of blanks.

Stock handling reduced

Two types of coil feed machines are used. A good example of the savings which can be made with automatic coil feeding may be seen from an application to a blanking operation for automobile bumper-guard anchor plates. Previously stock in 10-ft lengths was handled by the operators. Savings were realized in material costs through use of coil instead of strip stock, and in lower labor cost.

A second type coil feed is used in blanking and forming stainless cap moldings. Stock is 0.018 in. by 10½ in. wide. Coil weight is 4000 lb.

The formed piece is blown from the die against a limit switch and then drops to a conveyor belt. Action of the piece against the limit switch causes press and feeder to repeat the operations, at the rate of 2000 press-strokes-per-hour. If a piece does not come out and hit the limit switch, the operation will stop until the cause for failure has been corrected and the press restarted. Cage guards completely enclose the die, and the operator need only reload the feeder.

In the case of a steel inner bar for front end grilles, the operation is the same but the material is cold rolled steel, 0.031 in. by 11 1/16 in. Coils weigh up to 6000 lb.

Mechanical unloaders are widely used for removing parts from punch presses. Originally designed for use on large automobile panels, they are now used for a variety of smaller but awkward-to-handle parts.

Although some plants make their own version of the "iron hand," suitable units can be purchased. Three sizes are offered for mounting on punch presses. These handle stampings from 20 to more than 100 lb at from 20 to 300 pieces per min. A new, portable type automatic unloader removes 35 parts per min.

Three presses linked

The unloader moves into the die and grips the part at the moment the ram rises. It lifts the part out of the die and swings back, placing the part on a table or conveyor, then returns to its original position.

Three units were installed on a press line for bumper guards. Press operations include: Draw, 300-ton toggle type press; trim, 290-ton single action press; cut-apart, 75-ton press.

In the draw operation, the operator uses pliers to place an oblong blank of 0.072 in. stock 12½x24½ in. onto the die. He then depresses two operating buttons which he must hold until the die is completely closed. When the press cycle is complete, the operator removes the piece with pliers and places it on a table to his left.

As a safety measure, the operator is not allowed to remove the piece until press ram and blank holder movement have stopped. This protects the operator in case of electrical or mechanical failure which would allow the press to repeat.

This type equipment eliminates any need for movements in and out of the die by the operators. It also eliminates the time allowed for the operator to remove parts since the device can move in and remove the piece as soon as the press begins to open. Saving this time helps increase hourly production. Similar time savings were made in the trim operation.

COMMON CAUSES OF PUNCH PRESS ACCIDENTS

Placing hands in "pinch point" areas.
Improper placing of hands.
Using hands instead of clamps.
Placing pieces improperly.
Fastening down one button of a two-hand control.
Handling and turning dies over on die tables or on the floor.
Insufficient operator training or follow-up.
Using hands or fingers instead of safety pliers.
Two or more persons operating a press.
Failing to keep safety guards or equipment in repair.
Failing to keep work area clean.
Failing to concentrate on operation.
Mechanical failure of press.

A comparison of old and new methods showed that in improving safety, increased production and lower overall manufacturing costs for these operations would pay for the equipment.

Conveyor feeding of parts into a punch press was recently adopted on a hug cap assembly clinching operation. Parts are automatically removed from the press by an air-operated piston with hook attached. This is attached to the front of the press and operated by a limit switch and solenoid valve. Automatic operation made the clinching operation safer. Formerly two operators were needed to perform five operations. Only one operator was needed after the automatic equipment was installed.

An electric eye causes the press to operate when a part slides down the gravity chute and into the die. The sequence of operations with automatic equipment is: (1) Remove hub cap body from bin. (2) Remove hub cap cover from conveyor line. (3) Place cover over body and place assembly on inclined belt conveyor feeding punch press. The operation, from this point forward, is automatic.

After the clinch operation, a cam on the press crankshaft trips a limit switch which controls the removal device. The hook at the end of the rod on the air cylinder pulls the completed hub cap assembly out of the die and onto another gravity chute. In sliding down this chute, the hub cap assembly passes over another limit switch before dropping onto a conveyor line which takes the assembly to the packers. The press will not begin a new cycle until this limit switch has been tripped by an outgoing assembly. This protects the die against damage due to "doubles."

Chop up scrap for safer handling

Many safety features can be included in the design of dies for punch presses. Typical examples are scrap cutters, guide post guards, kickers, drop-through dies, and pick-offs.

In blanking operations and in large trim operations, there is metal left that is no longer a piece being manufactured. To make this metal safer to handle, it is usually cut into small pieces.

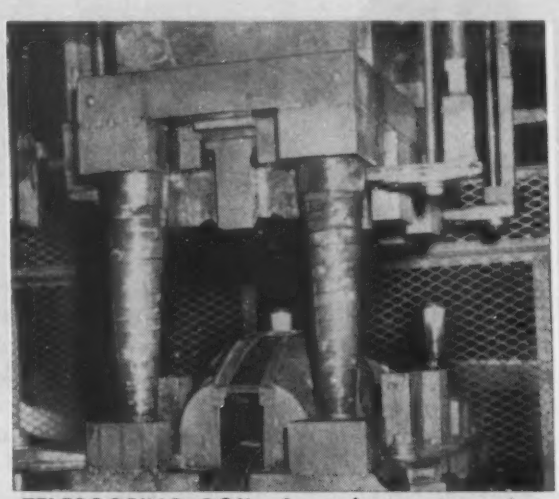
In blanking operations where a skeleton is coming out of the die, scrap cutters can be attached to the outgoing end of the die. These act as shears, and, with each stroke of the press, cut off metal coming out of the die. The cut off scrap is directed into a scrap conveyor and is not handled.

Most dies require guide posts and bushings. When the press is open, the guide post is out of the guide bushing. This situation presents the danger of an injury should an operator place his hand over either the guide post or the guide post bushing when the die closes.

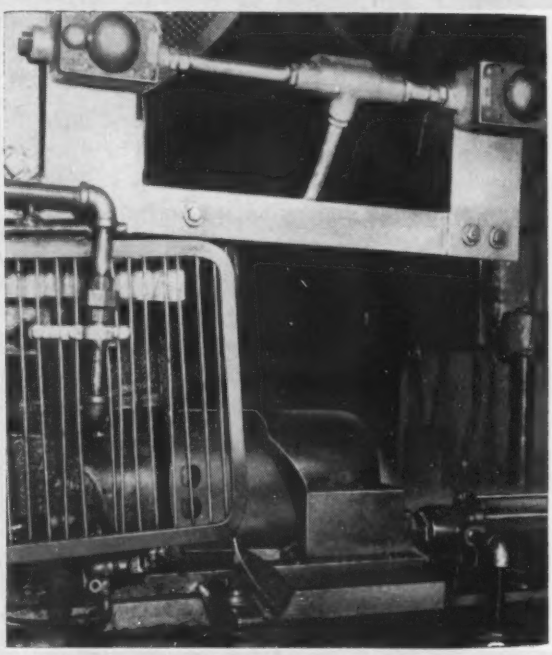
One safeguard against this hazard is to use telescoping and spring type guide post guards. Another uses guide post extensions so that the guide post does not come out of the guide post bushing.

A recent development of the Fisher Body Div., General Motors Corp., is a gadget known as a kicker. The kicker, or parts ejector, is an air cylinder which locates on or in the die. It is actuated by the up-stroke of the press and kicks the completed part from the die.

Drop-through dies for blanking operations are particularly advantageous for easy and safe parts removal of parts.



TELESCOPING COIL of metal protects against injury from guide posts. Rear guide posts are beyond operator, do not need special guards.



TRIM OPERATION on bumper guard starts with part nested in power operated slide. Two control buttons, top, actuate the slide and the press. Nest can only be loaded outside the guard.

For jets and tools—

Borides Designed for High Temperature Use

By Dr. Paul Schwarzkopf
Vice President and Director

F. W. Glaser
Director
Borolite Corp.
Yonkers, N. Y.

◆ Sintered borides of zirconium, chromium and molybdenum, developed to meet special defense needs, have potential applications in industry . . . The borides are cermets with high melting points, oxidation resistance and high temperature strength.

◆ Thermal shock resistance is good but impact strength is below that of cast superalloys . . . Molybdenum boride, made from domestic base materials has cutting qualities similar to the carbides.

◆ BONDED BORIDES of zirconium, chromium and molybdenum, developed to meet specialized defense needs, have engineering properties which can be put to work in many commercial applications. New applications involving parts operating in molten metals, and a new domestic source for a carbide-competitive cutting material are within the reach of industry.

Jet and rocket engine designers have long sought materials suitable for sustained use at 2000° F and capable of resisting stresses inherent in the operations of these engines. Borides of zirconium and chromium were developed in answer to these needs.

Zirconium and chromium borides have high melting points, 3000° and 1750° C respectively, possess good oxidation resistance and require no raw materials depending on overseas sources of supply. Zirconium and chromium borides, sold as Borolite I and Borolite III, are—together with similar materials developed by American Electro Metal Corp.—produced and marketed by the Borolite Corp. Much basic development work was done by AEMC.

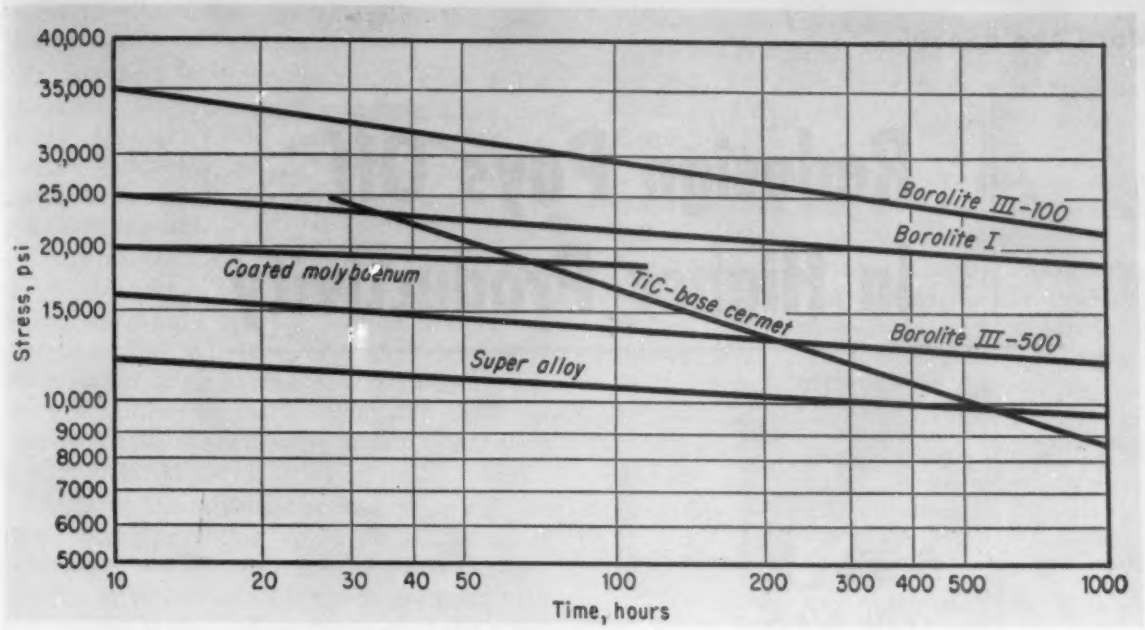
To meet anticipated needs for these products, production methods are being further developed by the Borolite Corp. Present pilot plant facilities are working toward reduced fabricating costs of these materials, while providing facilities for special customer orders.

RESISTANCE TO MOLTEN METALS*

Metal**	Test Temp, Deg F	Test Duration, Hours	Boron and Zirconium Content of Metal	
			Before	After
Aluminum..	1470	115	No B, no Zr	Trace B and Zr
Tin.....	750	100	No B, no Zr	No B, no Zr
Brass 90/10	2010	144	0.080 pct B, no Zr	0.097 pct B, no Zr
Brass 65/15	2010	116	None	0.037 pct B, no Zr
Brass 80/20	2010	100	Trace B, no Zr	0.037 pct B, no Zr
Lead.....	750	104	No B, no Zr	No B, no Zr
Copper....	2010	109	No B, no Zr	No B, no Zr

* Note: Tests conducted by melting metals in Borolite I crucibles.
** No wetting of crucible was noticed in any of the above cases.

MOLD LINER, top, crucible and test pieces were produced from the new boride materials.



COMPARISON of average stress rupture data of high temperature materials at 1800°F.

The borides fall in the "cermet" category. In addition to their high melting points they are oxidation resistant, have high temperature strength, and are good conductors of heat and electricity. Both zirconium and chromium boride have good thermal shock resistance, but are inferior to cast superalloys in impact strength. To improve impact properties, further research is being carried out under the auspices of the Office of Naval Research, which sponsored previous work on these materials.

Zirconium boride has excellent corrosion resistance to a number of molten metals and alloys. The Table gives the results of tests to establish quantitative corrosion resistance properties. Both zirconium and chromium boride exhibit good stress-to-rupture strength at elevated temperatures as compared to other high temperature materials.

Either hot pressing, pressure sintering or cold pressing and sintering are used to fabricate the zirconium and chromium borides. Linear shrinkage from the green to the finished sintered piece amounts to 17 pct for zirconium boride and about 20 pct for chromium boride. Corresponding allowances have to be made when designing a die for cold pressing.

In view of the hardness of these materials, diamond grinding is necessary. They lend themselves readily to electrolytic machining methods.

Zirconium boride has been successfully used in aluminum diecasting for pump parts and mold liners, and as a material for thermocouple protection tubes which are immersed in molten metals. New applications involving use of molten metals will now be possible. Moving parts, for example, may be kept submerged in molten metals. Zirconium boride is suitable as a crucible material for high vacuum, high temperature work, since the material does not decompose to poison the vacuum.

A molybdenum boride material in powder form (Mo-Braze) has already found extensive application for brazing molybdenum to molybdenum, tungsten to tungsten, and molybdenum to tungsten in the electronics and related industries. It melts at 3450° F and forms continuous, strong joints upon solidifying. It does not volatilize to any detectable extent at useful temperatures, whether in hydrogen or high vacuum. Tests for 1000 hours in 10^{-6} mm mercury vacuum did not indicate any poisoning of the vacuum. Both furnace and torch brazing can be used.

Other molybdenum boride base materials show promise as materials for cutting tools which in certain instances will be competitive with tungsten carbide grades. They are made of cheaper starting materials domestically available.

Improved cutting tools developed

Improved cutting tool materials have also been developed from a molybdenum boride base. The material was developed under auspices of the Office of Naval Research to provide cutting material of domestic origin with characteristics similar to cemented tungsten carbides. In machining tests, good results were obtained cutting a steel of 0.92 pct C, 1.55 pct Mn, 0.017 pct P, 0.019 pct S, 0.29 pct Si, and 0.23 pct Mo. Surface speed was 210 fpm with a depth of cut of 0.1 in. at a feed of 0.0104 ipr.

Tool life as measured by flank wear is approximately that of a commercially available cemented tungsten carbide. Preliminary tests indicate that for cutting brass and aluminum, this material is comparable to commercial tungsten carbide tool tips. On cast iron, at about 135 sfpm life of the boride tool will exceed that of the carbide tool.

More eye appeal—

Redesign Pays Off In Higher Productivity

By W. G. Patton
Asst. Technical Editor

◆ High speed production and ability to pay off the investment quickly may justify the purchase of new equipment long before older, slower machines are worn out . . . A Detroit builder of special machine tools, confident this basic automotive tooling philosophy would pay off in other industries, bought the business of a leading producer of pharmaceutical machinery.

◆ This is a progress report, showing production gains, design and maintenance improvements built into the new models . . . More efficient electrical devices, new materials and more eye appeal are showing up in improved performance and customer acceptance.

◆ IF YOU HAD an opportunity to modernize an entire line of machines so successful they remained virtually unchanged for 25 years, where would you begin? These machines are mechanically reliable. They are thoroughly tested in service and have excellent customer acceptance. Volume of service parts sold annually is a relatively large part of gross sales.

These were the basic considerations that faced executives of Snyder Tool and Engineering Co. when, in 1948, this Detroit builder of special machine tools took over Arthur Colton Co. For 70 years, Colton has been a leading producer of pharmaceutical machinery.

Several basic decisions were made in planning new Colton models: (1) Productivity of the machines must be increased substantially, while maintaining or improving standards of performance; (2) attractiveness of the new machines must be improved by modern design; (3) maintenance expense should be reduced wherever possible.

Accompanying these major redesign gains are other noteworthy features. The new machines are more compact and streamlined. Production per sq ft of floor space has been increased. Parts subject to vibration have been reduced in size. Controls are more fool-proof and more accessible. Gear trains and motors are protected against dust and dirt. In many cases, gears run in oil to insure dust-free, trouble-free operation. Gears are quieter and drives are more flexible.

Changes were also made in materials and lubrication. Many of the new high production machines employ welded steel fabrication where gray iron castings were formerly specified. Substitution of high strength ductile cast iron for ordinary gray iron has quadrupled available strength and generally assured sounder castings.

Better bearings aid production

High volume, trouble-free performance depends largely on better bearings and lubrication. In many instances, production gains in the new machines exceed 200 pct. These increases have been made possible through close coupled support, better bearings and improved lubrication. New lubricants containing silicone provided the answer to some difficult lubrication problems.

Pharmaceutical machinery falls into two broad categories, filling and tableting equipment. Each type requires precision workmanship and rigid construction. Anti-friction bearings and dust-proof mechanisms are invariably used to insure practically vibrationless operation and long machine life, coupled with minimum downtime.

Many machines operate automatically. An operator is required only to fill the hopper. Often, he does not even remove the finished product. Ma-

chines have to be fool-proofed against the possibility of accidental injuries.

In the field of high production tube filling equipment, the firm's single and twin filling machines package tooth paste, shaving cream, lotions, lubricants, paint, sealing compounds, plastic wood and rubber products at rates up to 170 tubes per min.

These machines are adjustable to accommodate the characteristics of the various products. Some filling units have stirring devices. Others use heating jackets to improve or control viscosity of the material being packaged. While major parts are often interchangeable, many machines are tailor-made to at least some extent to handle a specific material.

Similarly, the tableting presses are very high speed units, producing up to 3000 tablets per min. Each machine has flexible press capacity ranging up to 200 tons. Simply by changing tools and making certain adjustments, a wide variety of tablets can be produced in a single machine.

Interchangeability of many tools like punches and dies reduces production costs. Colton tools may also be used in many other tablet presses.

Compact and streamlined

Recently specifications compared an early model and a newer machine. The production rate has been increased from 375 to 700 tablets per min. Yet power requirements have been reduced one-third.

The rotary tablet presses shown are fully automatic, multiple-station units.

The company also makes semiautomatic and hand-operated tube fillers to meet production requirements. The fully automatic tube filler, closer and crimper is capable of filling 120 tubes per min. The tube filling machine occupies only 66 sq ft of floor space and is driven by a 2 hp motor.

Design details of the modern and the earlier tablet and tube filling machines are interesting. Increased compactness and streamlining of the new machines is evident. The new unit is easier to clean. Controls are easily accessible. Protection against dust is apparent. In most instances variable speed drives have been substituted for line shaft drives. Drive gears of the new machines are fully enclosed, generally running in oil.

On tablet presses, ductile cast iron with a tensile strength of 80,000 psi has been substituted for gray iron which tests about 20,000 psi.

Engineered for high output

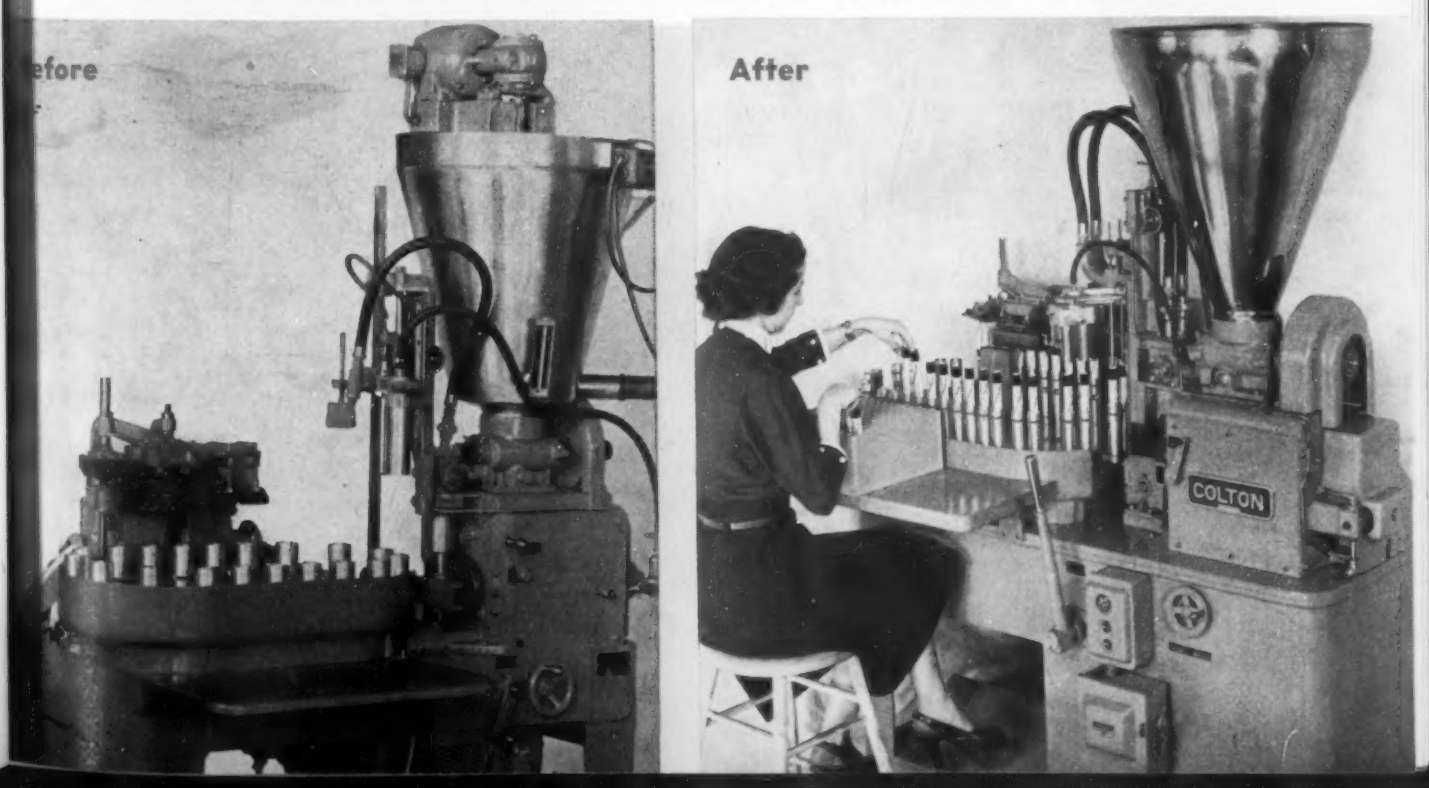
These modern tube filling machines are capable of filling larger tubes at substantially higher speeds. Most important is the improved flexibility of the new machines. These can package liquids, semi-liquids or powdered materials. They will easily handle light fluids or heavy compounds like calking material, putty, etc.

All tubes are filled with metered amounts of material. Tubes are crimped and closed automatically.

Vacuum systems may be used to carry away dust or undesirable odors on tube fillers and tablet machines.

The new rotary tablet presses are engineered for fast, economical production of all kinds of tablets made from granulations, and also for preforming plastic materials. A single high pro-

COMPACT, STREAMLINED, with handy controls and variable speed drive, the new, automatic tube filler and crimper, right, will outproduce its predecessor, left, up to 200 pct.



Punches must be carefully sized to permit trapped air to escape while producing the tablet . . .

duction, double rotary tablet machine can turn out more than 1¼ million tablets in a single working day.

Bases for most of the new machines are welded, box type construction. Welded fabrications are stress relieved and are designed to provide maximum rigidity and freedom from vibration. Rotary heads are made of high strength ductile iron. In some machines, steel die tables are used. This permits substantial reduction in size of the rotating unit, thereby reducing peripheral speeds and minimizing vibration.

A micrometer cell adjustment makes it possible to maintain accurate tablet weight at all times. Dies are overfilled and then leveled off to proper cell height.

A variable speed drive is required for different types of tablet material. An automatic, adjustable, excess pressure release protects machines against accidental damage.

Operating principle of the tablet machine is simple. Granulation is fed automatically into the die cavity. Cam action brings an upper and lower punch together. A pressure roll then supplies necessary force for compaction.

Punches must be carefully sized to permit trapped air to escape while simultaneously producing a well-formed tablet that is free from flash. Where air is trapped and not allowed to escape, imperfect tablets may be produced. Punch sizes must be held within 0.001 and 0.0015 in. to insure high quality.

Where tablets are made of highly abrasive materials, punch and die compositions may be changed to suit the application. High carbon, high chromium, air hardening tool steel has excellent shock resistance as well as outstanding wear resistance.

Under exceptional circumstances, chromium-plated dies and punches or carbide dies and punches with inserted carbide tips may be used. Cost of carbide tools, while relatively high, may be justified in some applications. Tablet production requires excellent resistance to impact as well as good resistance to wear and abrasion.

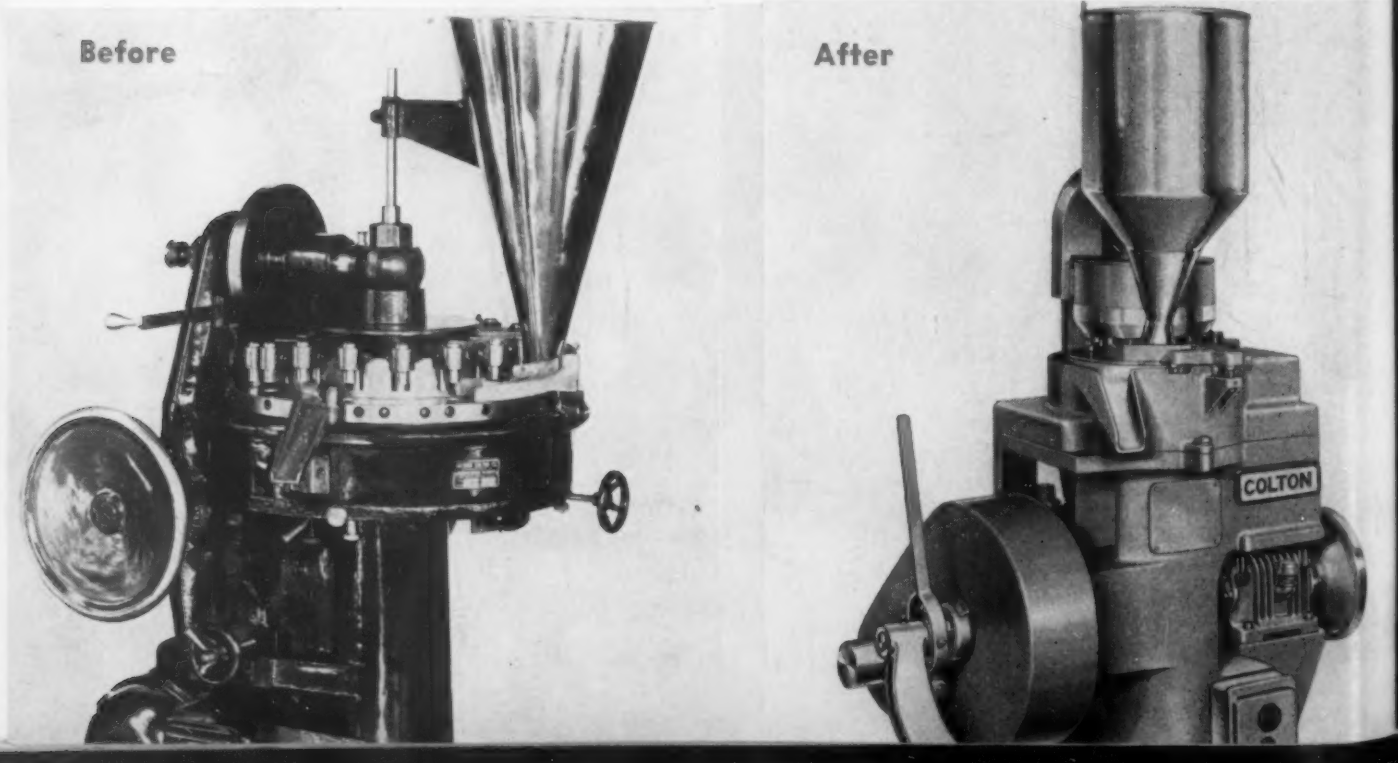
A direct comparison of two tablet machines throws interesting light on recent progress in pharmaceutical machinery. Where the earlier machine had a belt drive, a variable speed drive has been substituted. The old machine had a cast one-piece base; the later model uses either a pedestal type or a welded box type frame.

Heads are smaller now

A comparatively large rotating head was employed in the earlier machines; the new heads are much smaller and are equipped with as many as 41 punches and dies. Because of a substantial reduction in weight and improved bearings, the new machines, operating at higher speeds, are much freer from vibration.

Replacing some hammer-type punches in the older machines are new free-floating upper and lower punches. These are self-aligning and fully adjustable. Earlier machines employed extensive linkage which is not used in the latest models. Where punches were non-interchangeable, now they are often switched to other machines.

NEW TABLET PRESS, right, features a welded frame, improved bearings, floating high speed punches, positive controls, smaller rotating head. Old model, left, was slower, used more power.



Brainard Steel Announces

STEEL STRAPPING and STRAPPING TAPE from one source!

The first complete strapping service

STEEL STRAPPING—Brainard's complete line of steel strapping, tools, and accessories covers over 1500 items. Strapping a heavy box, shown here, is a job ideally suited for steel strapping, which secures, reinforces, and prevents loss and pilfering.

• The Brainard Strapping System has been expanded to include a complete line of strapping tapes, both pressure-sensitive and gummed, as well as dispensers for all applications. *For the first time* you can fill all your requirements—whether steel strapping or strapping tape—from one source.

Only your Brainard salesman is in position to give you completely unbiased recommendations—and advise you with authority which strapping methods are best for your particular applications. You do not have to weigh conflicting recommendations. This complete service also enables you to consolidate orders, simplify your purchasing, and save time.

Brainard salesmen, located throughout the U. S. and in Canada, are trained to study your operations, make recommendations, and give your personnel on-the-job demonstrations. Call your Brainard salesman today—or send the coupon for further information.

STRAPPING TAPE
Brainard is the only prime source for both pressure-sensitive and gummed strapping tapes. Both are filament-reinforced to provide high tensile strength, and are designed for strapping applications. Carton reinforcement, shown here, is typical of many applications where tape may be the preferred method. Brainard Strapping Tapes are available in a complete range of sizes.

Brainard
SHARONSTEEL
STEEL DIVISION
SHARON STEEL CORPORATION

Brainard Steel Division, Dept. O-4
Griswold Street, Warren, Ohio

☐ I would like a Brainard Strapping System analysis.
☐ Please send booklet on Brainard Strapping Tape.

Name_____

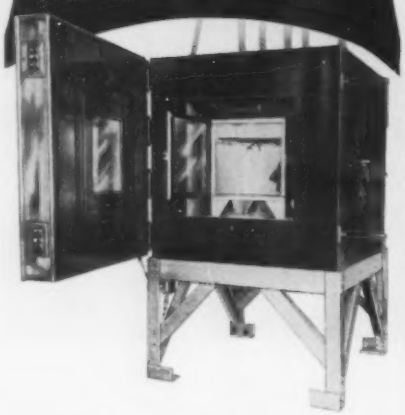
Position_____

Company_____

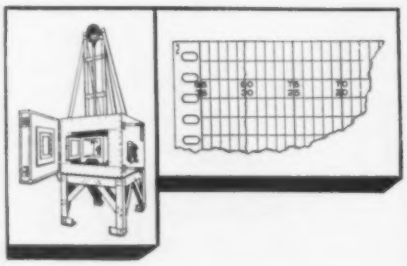
Address_____

City_____ State_____

Another BOWSER First . . . . . the NON-MAGNETIC CHAMBER



The unit produces any temperature from −112° F to 68° F . . . and HOLDS it . . . with temperature control of ± 0.1° F.



Stray magnetic fields can be a big headache in the development testing of pure metals. But not in this new chamber engineered by Bowser.

Used in determining effects of temperature on electrical fields, this Bowser non-magnetic chamber does not contain an ounce of steel that could hamper testing. It is constructed entirely of brass, copper, aluminum, rubber, bakelite, glass, wood and Fiberglas. All motors and electrical components are located over 6 feet away to eliminate effects of their electrical fields.

A special inner chamber thermally governed by vernier control is a double guarantee of testing accuracy.

For all your needs in environmental test equipment, be sure to check with Bowser — the pioneer. A field engineer will be glad to discuss your needs (at no obligation).

BOWSER TECHNICAL REFRIGERATION

DIVISION BOWSER, INC. TERRYVILLE CONN.

Technical Briefs

Piping:

Built in steam line speeds movement of viscous fluids.

Movement of heavy, viscous fluids can be speeded up by using a novel extruded aluminum pipe which incorporates a separate steam line as in integral part of the extrusion.

The extruded aluminum piping, called Unitrace, is the result of joint engineering efforts by Alcoa and Hercules Powder Co. to find a new solution to the problem of applying heat to product piping.

Prevents Solidification

Piping users who handle sluggish chemicals such as tar and pitch or tricky solutions such as ammonium nitrate need heated lines to prevent their products from solidifying or crystallizing in the line.

In contrast to normal methods of heating lines by using an external steam jacket or steam tube to apply the necessary heat, the piping is made so the steam line is an integral part of the pipe.

Extruded As A Unit

Extruded as a single unit from Alcoa 3S-F aluminum alloy, the new product is slightly oval in cross section because of the crescent-shaped steam passage adjacent to the product line. The size now available has the pipe dimensions of 2 in., Schedule 40 pipe.

In this installation, the piping resulted in the following savings over conventional 2-in. steam jacketed lines: 38¢ per ft on material; 5¢ per ft on insulation; 30 pct reduction in labor costs.

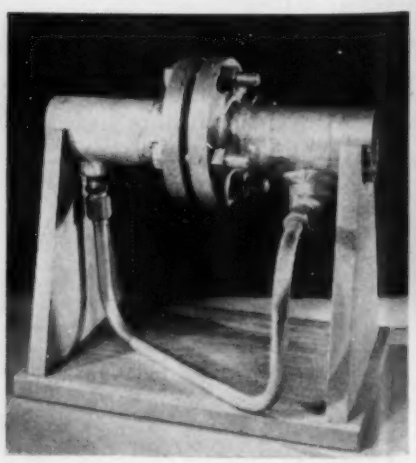
Improved Heat Transfer

The piping shows improved heat transfer properties over normal steam tracing techniques. The expense of steam jacketing and its installation is eliminated.

Preformed insulation will fit unitrace. In the case of the 2-in. pipe, the new product is designed so that insulation for 2½-in. standard pipe will form naturally.

When insulation is used, a smaller size can be used than with the older steam-jacketed piping. But because of improved efficiency, thermal insulation will be unnecessary in many cases, particularly where set quantities of process steam are allocated for tracing.

Steam line built in . . .



. . . How lines are joined

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 99. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Babbitting:

Follow these rules for longer bearing life.

Much machinery still relies on babbitted bearings for efficient operation. Bearing failures can cause machinery damage and can lead to even greater losses in downtime.

Downtime will be markedly reduced and repair costs minimized through care in selection and use of babbitting materials.

Tin Base for High Speeds

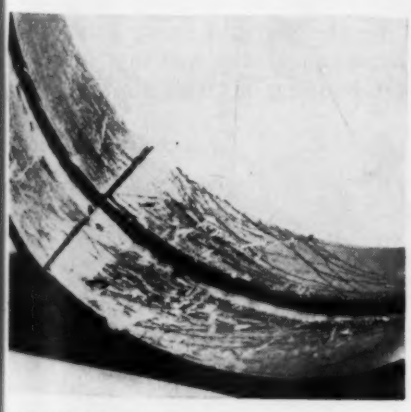
Selection of the proper bearing metal can extend bearing life. The recommendation of the equipment supplier or a reputable manufacturer of bearing alloys should be sought and followed.

Generally, tin base babbitts are best for high speeds and heavy-duty service . . . lead-base babbitts for medium or low speeds and loads.

Keep Pot Clean

In making bearings, (melting), make sure that the melting pot is clean. Heat the kettle uniformly to prevent segregation. Stir the molten metal thoroughly by using a long-handled steel rod with a perforated steel plate attached.

Metal temperature should be controlled with a pyrometer. To avoid segregation, do not allow the metal to cool while in the pot,



BEARING SURFACE scored by microscopic abrasive particles in lubricating oil.

Turn Page

Keep in Step with—
STAINLESS TUBING
USERS WHO KNOW!
SPECIFY "Standard"
for Welded Stainless Steel Tubing
The Heat Exchanger exemplifies one of the severest uses for stainless tubing. "Standard's" stainless tubing meets this, as well as many other different requirements for strength, and heat and corrosion resistance.
Deal with the Specialist among Specialists
A tubing specialist, like other specialists, knows his trade best.
When you deal with "Standard" you deal with a tubing specialist who manufactures millions of feet of tubing every month from stainless and carbon steel—and for 25 years has been serving all types of industry for mechanical and pressure tubing applications.
If you need stainless tubing, be sure you specify "Standard". It pays to deal with the tubing specialist among specialists.
Stainless Tubing Size and Thickness
¼" O.D. to 4½" O.D.
.020 to .154 wall
Carbon Steel Tubing
½" O.D. to 5½" O.D.
.028 to .260 wall
THE STANDARD TUBE CO.
Detroit 28, Michigan
Welded Tubing
Fabricated Parts
STANDARDIZE with STANDARD — It Pays

WHELAND COMPANY solves warpage problem, saves time, labor and materials with

FARQUHAR Hydraulic Presses

This straightening operation utilizes a 50-ton Gap-Type Farquhar Press on an 8-hour-day production basis.

500-ton Farquhar Hydraulic Press straightens 16' A forged tubes at The Wheland Co., Chattanooga, Tenn.

THE Wheland Company, Chattanooga, Tennessee, uses Farquhar hydraulic presses to help speed production of vital defense products. For example, a 500-ton Farquhar Press is used for straightening forged tube approximately 16' long, varying in outside diameter from 6" to 10", with an inside bore of 2" diameter. This operation alone has solved one salvage problem, since less scrap results as stock distribution is equalized by straightening.

Scrap and salvage due to warpage have been eliminated in another operation, where a 50-ton Gap-Type Farquhar Press is used to straighten ⅞" bars, 3" wide, 65" long. Together, the two presses have speeded production. Neither press has required any maintenance other than regular services since installation!

Farquhar Presses Cut Your Costs

Just one more example of cost-cutting Farquhar performance in modern production! Farquhar Presses are built for the job . . . assure faster production due to rapid advance and return of the ram . . . greater accuracy because of the extra guides on the moving platen . . . easy, smooth operation with finger-tip controls . . . longer life due to positive control of speed and pressure on the die . . . long, dependable service with minimum maintenance cost!

Farquhar engineers are ready to help solve your production problems. Your request will bring them running . . . at no obligation, of course.

For free catalog, write to THE OLIVER CORPORATION, A. B. Farquhar Division, *Hydraulic Press Dept.*, 1503 Duke St., York, Pa.

Farquhar
HYDRAULIC PRESSES
for Bonding • Forming • Forcing • Straightening • Assembling • Drawing
Extruding • Jogglins • Forging • and other Metalworking Operations

THE OLIVER CORPORATION • A. B. FARQUHAR DIVISION

—Technical Briefs—

Shell should have a silvery appearance on removal from the bath . . .

or stand overnight. Keep out drosses, sweepings, or skimmings since they usually contain detrimental impurities.

Degrease and Etch

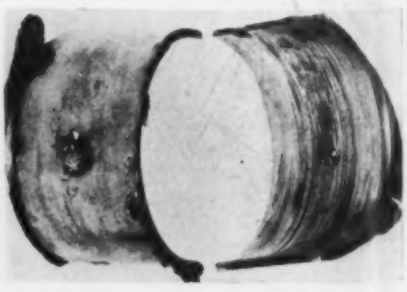
In bonding, machine the shell surface to a "phonograph" finish. Avoid use of lubricant when taking the final cut. Degrease in a commercial alkaline cleaner held just below its boiling point then etch for 3 to 5 minutes in an aqueous solution of 50 pct hydrochloric (muriatic) acid held at 160° to 180°F. If not clean, repeat degreasing and etching.

Dip The Shell

Dip the metal into flux held at 150°F. A saturated solution of two parts of zinc chloride and one part ammonium chloride in water is usually satisfactory. Dip the shell into a bath of molten bonding alloy (tinner's solder) kept about 150°F above its liquidus temperature.

While Shell Is Hot

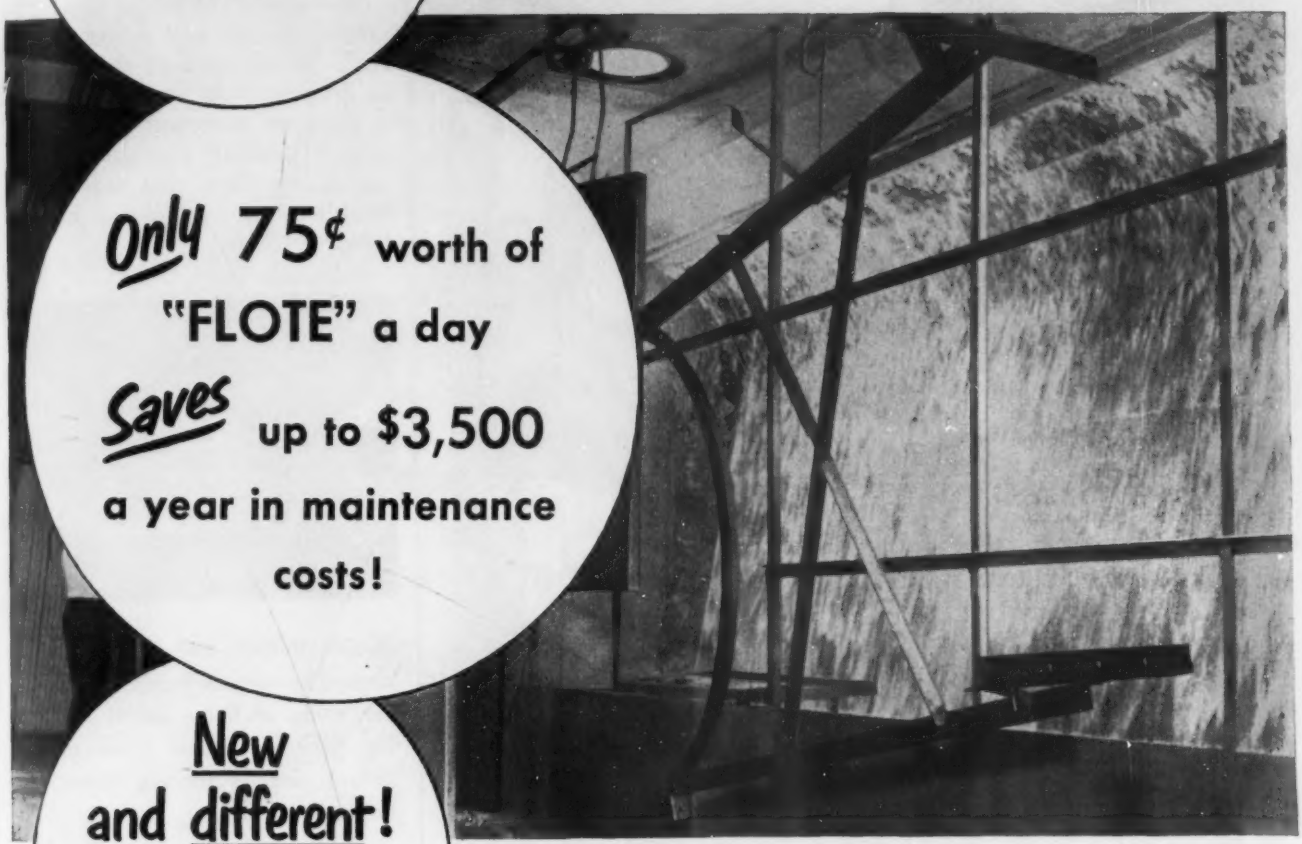
The shell should have a silvery appearance on removal from the bath. The shell should not be allowed to cool before casting the liner. In casting, mandrel and shell should be at temperatures higher than 250°F to eliminate the danger of moisture or steam. The shell should be at a temperature above the melting point of the bonding or tinning metal.



COMPLETELY WIPED bearing shows distress so severe that steel backing has plastically deformed.

Turn Page

NEW WYANDOTTE "FLOTE" for water-wash spray booths



Only 75¢ worth of "FLOTE" a day Saves up to $3,500 a year in maintenance costs!

New and different!

spray booth product, "FLOTE," eliminates sinking paint sludge, stops clogging and paint buildup!

Whatever organic finishes you use, no matter what type water-wash spray booth you employ — new "FLOTE" will increase operating efficiency and cut maintenance costs!

Think of it! New "FLOTE" added to your water system floats all types of sludge—even heavy primers—and *keeps them afloat* for easy skimming. In a spray booth like the one above, as little as 75¢ worth of "FLOTE" a day can save you up to $3,500 a year in maintenance costs!

"FLOTE" away your paint booth problems. For full information on this remarkable, new and different Wyandotte product, mail coupon today!

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WYANDOTTE CHEMICALS CORPORATION
Wyandotte, Michigan • Los Angeles 12, Calif.

Helpful service representatives in 138 cities in the United States and Canada

Largest manufacturers of specialized cleaning products for business and industry

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Wyandotte Chemicals Corporation
Wyandotte, Michigan

Send me further data on "FLOTE" ☐
Have a representative call ☐

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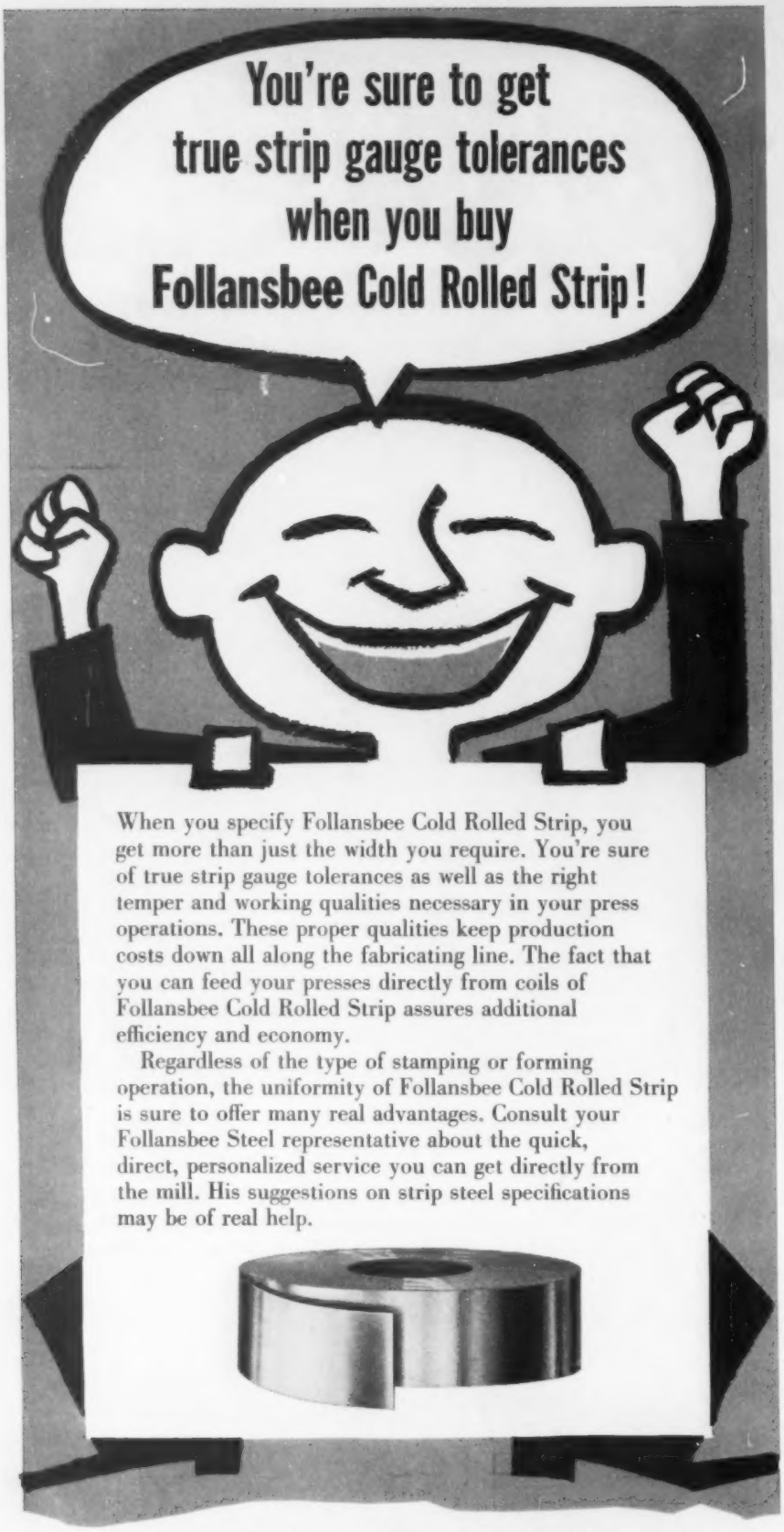
Firm_____

Address_____

City_____ Zone____ State_____


You're sure to get
true strip gauge tolerances
when you buy
Follansbee Cold Rolled Strip!
When you specify Follansbee Cold Rolled Strip, you get more than just the width you require. You're sure of true strip gauge tolerances as well as the right temper and working qualities necessary in your press operations. These proper qualities keep production costs down all along the fabricating line. The fact that you can feed your presses directly from coils of Follansbee Cold Rolled Strip assures additional efficiency and economy.
Regardless of the type of stamping or forming operation, the uniformity of Follansbee Cold Rolled Strip is sure to offer many real advantages. Consult your Follansbee Steel representative about the quick, direct, personalized service you can get directly from the mill. His suggestions on strip steel specifications may be of real help.
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COLD ROLLED STRIP
Sales Offices—New York, Philadelphia, Rochester, Cleveland, Detroit, Milwaukee, Chicago, Indianapolis, Kansas City, Nashville, Los Angeles, San Francisco, Seattle, Toronto and Montreal, Canada. Plants—Follansbee, West Virginia.
Follansbee Metal Warehouses: Pittsburgh, Pa., Rochester, N. Y., Fairfield, Conn.

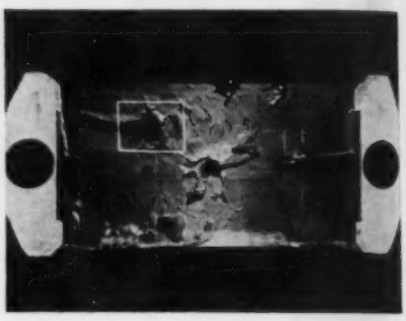
—Technical Briefs—

Better babbitt bearings . . .

The temperature of the mandrel should be approximately 100°F higher than that of the shell so that solidification can progress from the shell to the mandrel.

Pour Against Mandrel

The stream of metal should be poured against and moved around the circumference of the mandrel to prevent local overheating. Use a ladle of sufficient capacity to permit pouring the entire bearing at one time; this reduces the likelihood of cold shuts, laminations, or folds.



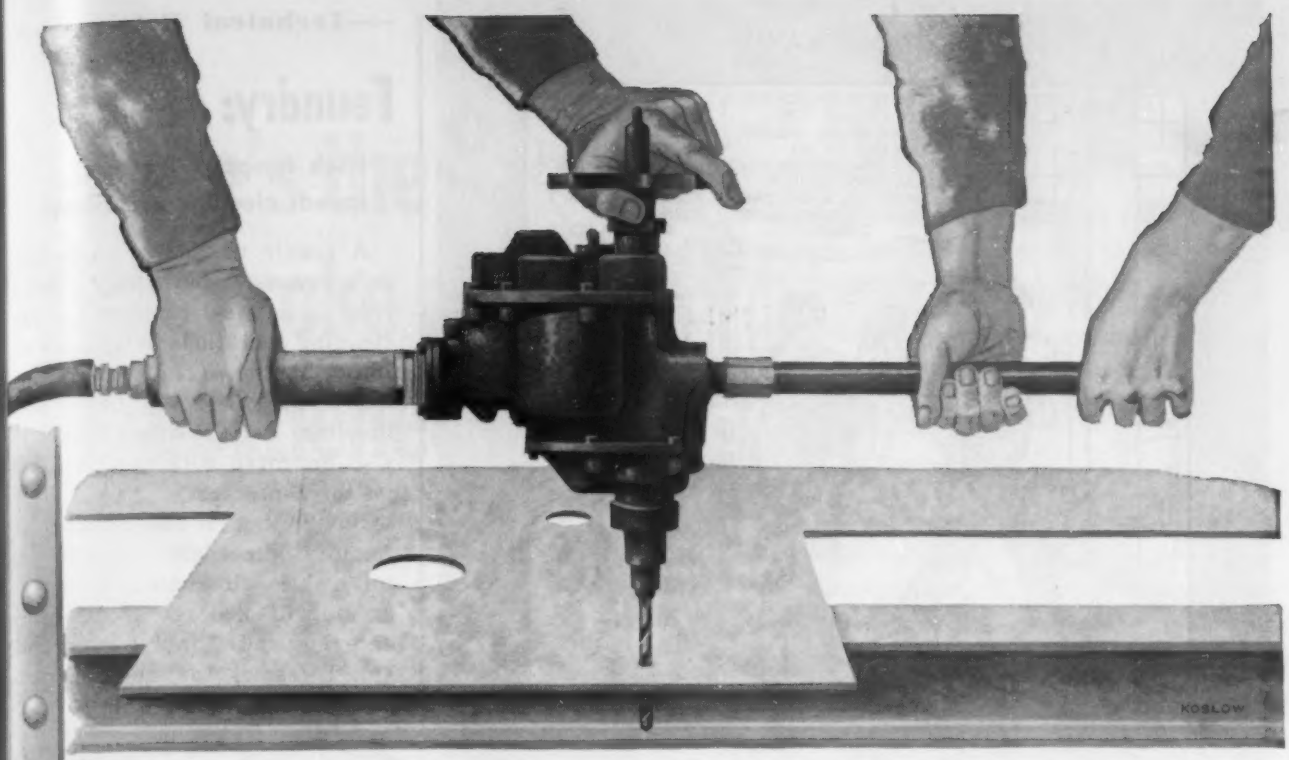
POOR BOND and metal fatigue caused bearing surface to fail. Breaking away of lining metal of bearing generally occurs when applied stresses exceed fatigue strength of the bearing alloy.

Sponsor Welding Essay Contest

Stimulation of interest in use of positioning equipment by industry is sought in a "Positioned Welding Essay Contest," sponsored by The Panjiris Weldment Co., St. Louis, Mo. Cash prizes ranging from $500 to $50 will be offered.

Essays may range up to 1500 words and should describe use of positioning equipment, especially where such equipment has resulted in a better product, lower product cost, and increased production. Data on costs should be specific and photos and drawing should be included. Material may cover electric arc, submerged melt, or inert gas welding. Three copies should be mailed to the company, Box 193, General Post Office, New York 1.

Turn Page



Need high capacity, long service life, small size?

here's how leading manufacturers of pneumatic tools get them with NEEDLE BEARINGS

Torrington Needle Bearings are used in many leading brands of pneumatic tools because of their ability to take heavy loading, their compactness, and their long life.

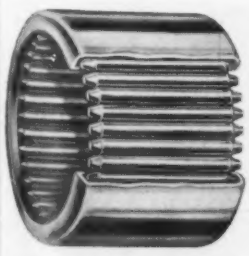
In wrenches, nut runners, drills, rivet hammers, impact and many other types of air-driven tools, the Needle Bearing's ability to boost power output and torque, while saving weight and space, has been proved again and again.

On spindles, idler gears, planetary gears and angle attachments, Needle Bearings enable tool designers to keep tools compact and light. They cost little more than plain bearings, yet they give high-capacity performance over long periods with minimum maintenance.

Throughout industry, Torrington Needle Bearings have become "standard equipment" since their introduction nearly twenty years ago. When space is limited and high capacity is a "must," specify Needle Bearings.

Why not learn whether the Needle Bearing can benefit your products. Our engineers will be glad to assist you.

THE TORRINGTON COMPANY
Torrington, Conn. • South Bend 21, Ind.



TORRINGTON *NEEDLE* BEARINGS

Needle • Spherical Roller • Cylindrical Roller • Tapered Roller • Ball • Needle Rollers

Trade-marks of leading pneumatic tool manufacturers whose products enjoy the benefits of Needle Bearings.

Ingersoll-Rand · Mall · Buckeye Tools Corporation, Division 39 • Dayton 1, Ohio · CLECO Air Tools · Porter-Cable Quality Electric Tools · K Keller Tools · Sundstrand · Milwaukee · Thor · NS National Air Sander · Rotor Tool · ARO

OUT OUR WAY

I'VE SEEN DOZENS DO IT-- AN' DONE IT MYSELF FOR YEARS! RIGHT AFTER SPENDING ALL MY DOUGH ON CHRISTMAS I STALKED AROUND FOR A FEW DAYS WITH A FIRM RESOLVE TO BECOME A BOSS AN' EARN MORE DOUGH!
YOU'RE JUST JEALOUS BECAUSE HE TOLD THE BULL ABOUT SOL-SPEEDI-DRI FOR THESE FLOORS! DOESN'T LEAVE YOU ENOUGH TO GRIPE ABOUT!
J.R WILLIAMS
THE WONDER BOY

For clean, safe floors

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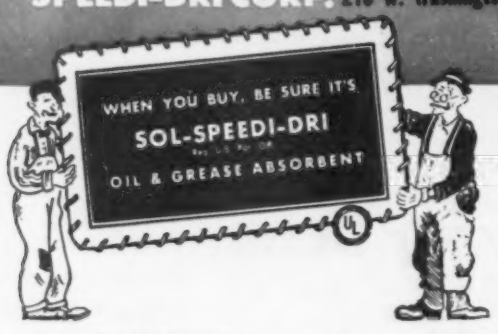
Industries large and small have acclaimed Sol-Speedi-Dri the leader among oil and grease absorbents. That's because wherever slippery, dirty floors cause trouble, Sol-Speedi-Dri does a bang-up "dry-cleaning" job, covers plenty of floor area, and can be used again and again. Consistent high quality is insured by strict laboratory controls. Why not try it on your floors? Send coupon today for a free sample!

SPEEDI-DRI CORP. 210 W. Washington Sq., Philadelphia 5, Pa.



Warehouse stocks maintained in principal cities of the United States and Canada.

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Inquirers in New York, New England, and New Jersey should write to Speedi-Dri Corp. Elsewhere in U.S. to Waverly Petroleum Products Co., 1724 Chestnut St., Phila. 3, Pa. In Canada, G. H. Wood & Company Ltd., Toronto. Branches throughout Canada.

FREE SAMPLE Fill out the coupon and mail today for free sample and literature.

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1A-4/54

—**Technical Briefs**—

Foundry:

High temperature torch speeds cleaning of castings.

A simple method of correcting defects and removing excess metal from large steel castings has cut cleaning operations by as much as 75 pct for the ACCO Casting Div., American Chain & Cable Co., Reading, Pa. Quality of work is also improved with the Kwik-Arc jet torch process.

Now in its first year as standard foundry procedure, the 6000°F torch has eliminated a former backlog of castings awaiting the chipping and grinding operation, and is easier to handle than a pneumatic chipping gun.

Uses Carbon Electrode

The jet torch consists of a ½-in. diam carbon electrode, secured in a holder, with a small air jet be-

Jet torch cleans castings . .

. . . at Acco steel foundry

Turn Page

here's the bag that broke a bottleneck

A metal parts manufacturer found it was taking almost as long to package his clutch plates as to make them! Time was lost in grease-dipping every part, wrapping it and packaging in heavy wooden boxes. Result: *shipments weren't keeping up with production.*

Looking for ideas, he asked Cromwell for help. And our paper engineers had the answer in a hurry . . . a strong but lightweight *Ferro-Pak* paper bag.

Ferro-Pak broke the bottleneck. Now, as fast as they come off the production line, parts are bagged, sealed, slipped into lightweight containers and shipped for a fraction of former costs.

FREE SAMPLES—The increased efficiency and big savings that go with using *Ferro-Pak* for rustproof packaging of ferrous metal parts can be yours too. Write on your letterhead or send coupon for free samples and complete details.

Ferro-Pak is produced in compliance with Military Packaging Specification MIL-P-3420.

NEW CROMWELL FERRO-PAK®

—for rustproof packaging of all ferrous metal products

Only *Ferro-Pak* gives you these advantages:

- inhibitor applied equally to both sides of paper . . . ideal for use in interleaving.
- compatible with oil . . . no need to wipe off lubricants before wrapping.
- low cost . . . saves dollars, not just pennies.

PACKAGE IT IN SECONDS . . . grease and oil coatings eliminated.

OPEN IT AND IT'S READY for immediate use . . . no de-greasing

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first really new development in safety spectacles in years!

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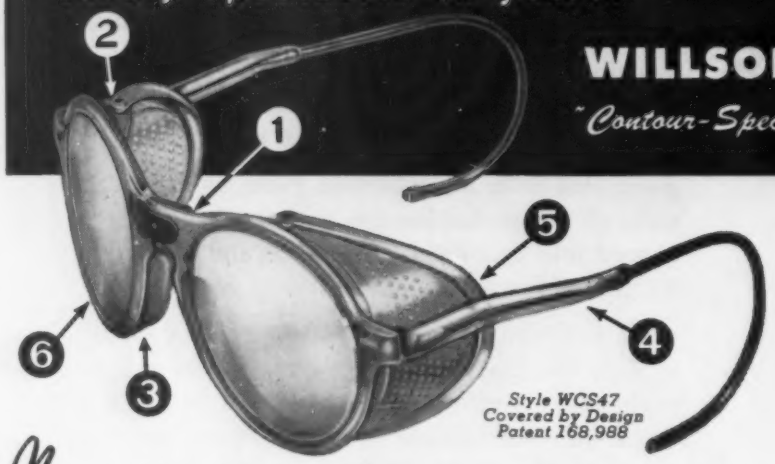
*"Contour-Spec"**

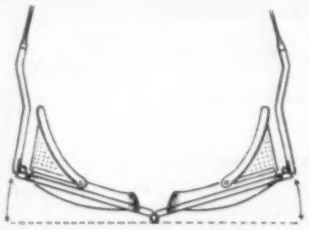


New... **hinged bridge gives snug, comfortable fit... self-adjusting to *any* facial contour!**

1. **New hinged bridge** combines the flexibility of cup-type goggles with the lightweight, compact protection of safety spectacles.
2. **One all-purpose size** permits universal fit. Bridge hinge gives automatic adjustment to any bridge width from 18-26 mm.; one eye size—47 mm.—fits everybody. *No need to stock a variety of bridge and eye sizes.*
3. **Plastic nose-and-cheek pads** provide *full closure* around eye cavity.
4. **Contour-shaped** adjustable plastic-and-cable temples hold spectacles firmly in place.
5. **Matching sideshields** are perforated plastic, providing protection at sides—*fold back* for pocket compactness.
6. **Butyrate frame**—*toughest plastic used for spectacles.* Standard frame is flesh colored, fitted with 6-curve Willson Super-Tough® glass lenses. Available also with green frame and sideshields, fitted with Willsonite® Super-Tough green glass lenses.

Hinged to fit any face snugly!

See how the unique hinged bridge allows the Contour-Spec to open up to fit broad faces and close up for narrow faces. It's this feature that allows Contour-Specs to contact the entire eye cavity and makes them fit so comfortably yet securely.



*Trademark

Order a supply of Contour-Specs from your Willson distributor. Let your workers try their amazingly greater comfort, and see how they're preferred over ordinary safety spectacles!

More Than 300 Safety Products Carry This Famous Trademark

WILLSON

Established 1870

WILLSON PRODUCTS, INC., 231 Washington Street, READING, PA.

neath it. When ignited, the electrode generates an electric arc of 6000°F which quickly melts shrinks, cracks, fused-in sand, fins, brackets, nails.

The accompanying jet of air blows the molten metal and slag away, leaving a casting of generally uniform contour. The jetted area cools in a few minutes and is then rebuilt with sound weld metal before the casting reaches the chipping and grinding operation.

Less Grinding Needed

In addition to speeding up the cleaning operation, this process removes much less parent metal than is possible with a chipping gun, and keeps subsequent welding and grinding to a minimum. It does not, however, cover up defects which might show up later.

The ACCO Casting Div., a leading producer of medium-sized castings for railroad, electrical and farm equipment use, reports the new process to be relatively inexpensive.

Chief outlay was for erection of metal welding booths to house the operation and to protect other workers in the area from the intense light. The jet torch operator wears a welder's helmet and protective clothing.

Derodding:

Tube straighteners used to simplify mandrel removal.

Derodding of hard brass, Inconel and other heat and corrosion resistant alloy tubes is now being done by Precision Tube Co., Inc., on a machine previously used for tube straightening.

This new task is assigned the machine in the North Wales, Pa., plant when a plug draw cannot be used. Derodding takes place on tubing with thin walls, generally under 0.020 in. Such tubing is conventionally drawn over a mandrel to specified diameters up to ½ in., with the die setting the outside diameter and the mandrel controlling the inside diameter.

Turn Page

Case No. 42

Kemp Immersion Heating Gets Top Results for Signode Steel Strapping Company

How Signode Steel Strapping Co. tempers 650 feet of steel strap every minute

At the Signode plant in Sparrows Point, Md., turning out up to a thousand miles of steel strap daily calls for fast, efficient production line techniques. One highly important phase in the final processing is the tempering bath. Here, Signode called on Kemp Engineers to supply the 15 ton, gas-operated Immersion Melting Pot shown above. Now steel strap is uniformly tempered at the rate of 650 feet per minute.

Kemp Offers More Advantages

By installing Kemp Immersion Heating, Signode benefits in many ways. Unlike underfired pots, Kemp pots are *not* subject to *periodic* and expensive shutdowns . . . won't crack or break. They operate *continuously* at maximum heating efficiency with a *substantial* savings in fuel costs. Offer a greater heating surface, faster heat recovery, lower dross formation, even lower room temperatures. At the same time, this Kemp unit enables Signode to eliminate costly temperature override and open flame fire hazards.

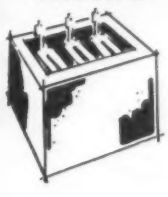
Let Kemp Solve Your Problems

These same advantages apply to all types of melting or heating operations. Whether you are engaged in tempering, annealing, descaling, coating, etc., you can rely on Kemp Immersion Heating. Why not find out how Kemp Engineers can help you, save you money?

This 10 ton oval pot is typical of the many Kemp installations now in use. Features Kemp Carburetor, part of all Kemp equipment, to deliver complete combustion . . . without waste . . . without tinkering. One-pipe air and fuel feed reduces installation costs, simplifies maintenance.

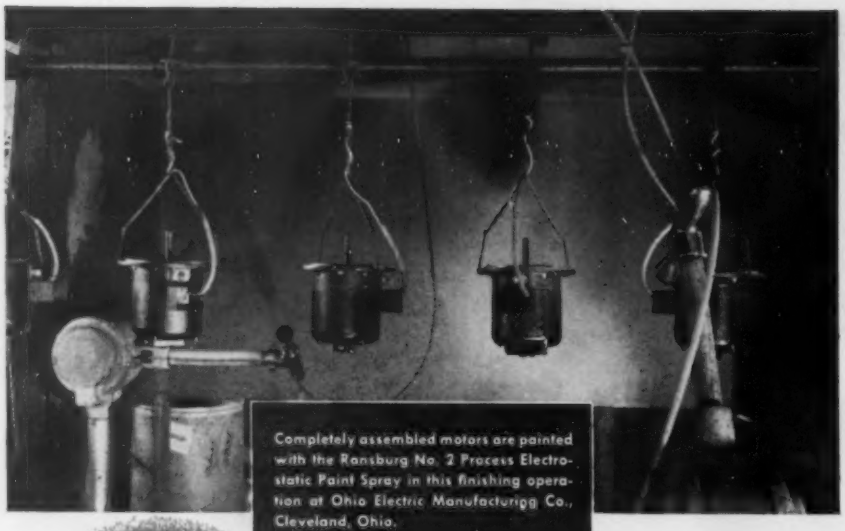
For more complete facts and technical information, write for Bulletin IE 11 to: C. M. KEMP MFG.CO., 405 East Oliver St., Baltimore 2, Maryland.

KEMP OF BALTIMORE



IMMERSION MELTING POTS

CARBURETORS • BURNERS • FIRE CHECKS
ATMOSPHERE & INERT GAS GENERATORS
ADSORPTIVE DRYERS • SINGEING EQUIPMENT



Completely assembled motors are painted with the Ransburg No. 2 Process Electrostatic Paint Spray in this finishing operation at Ohio Electric Manufacturing Co., Cleveland, Ohio.

Here's an Unique Application of the RANSBURG No. 2 PROCESS

● Both in this country, and in foreign countries as we the Ransburg No. 2 Process is being used by a variet of manufacturers for painting a widely varied line o products.

One of the most unusual applications of the No. 2 Process is that at Ohio Electric Manufacturing Co., Cleveland, Ohio, where completely assembled motors are painted automatically with the electrostatic paint spray.

Formerly, the motor frames, covers and terminal boxes were hand sprayed before assembly. Now, with the unmatched efficiencies of the No. 2 Process, the complete units are coated automatically with a black wrinkle enamel. As for paint mileage, they paint about 100 units an hour and use about 5 gallons of paint in an eight-hour shift. They're getting a higher quality, more uniform finish, and eliminate the paint runs which used to bother them with the former hand spray method.

See what Ransburg Electrostatic Processes will do for you in your plant. Complete facilities for test-painting YOUR products under simulated production conditions are available in Ransburg laboratories. Write for case history data on products in your field, or send for our sound and color movie, "Miracles in Painting."

Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana

RANSBURG

—Technical Briefs—

As each 14 to 16 ft length of tube is released by the draw bench, the derodding operator picks up the length and starts it through the six power-driven rolls of the unit.

Lifts Tube From Mandrel

By precise adjustment, rolls of the machine work the tube metal so its diameter is increased a few thousandths of an inch. This lifts the tube away from the mandrel, which is then easily slid out of the tube and returned to the draw bench operator.

Derodded tube is then given a light sink pass on the draw bench —the tube is drawn again through the die, with no inner mandrel. Sink pass employs only enough size reduction to closely govern final outside diameter of the tube. Each length of tube is then ready for straightening, inspection and shipment.

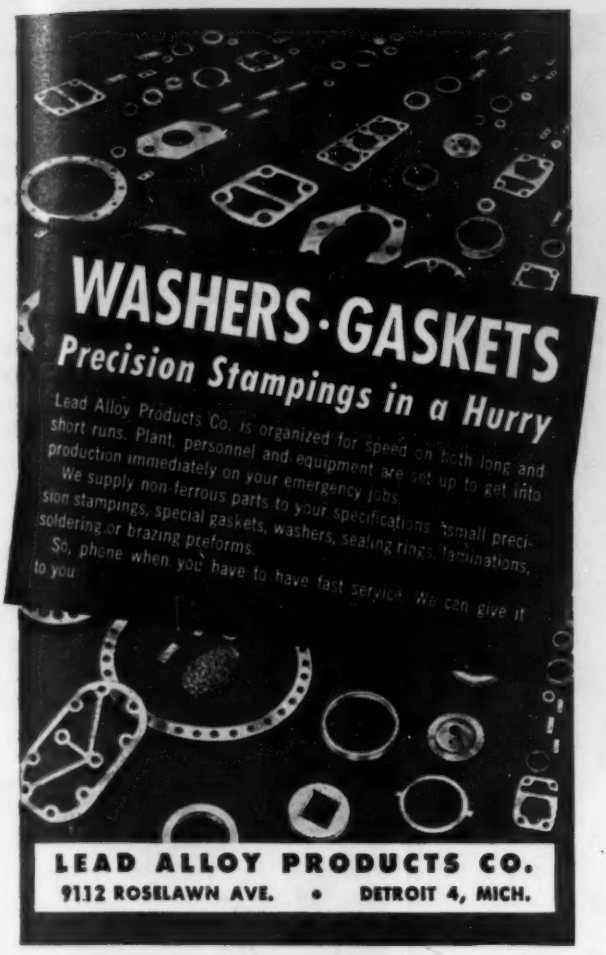
Surface Unmarked

The derodding unit has no guides that might mark tube surface, and the three sets of rolls provide ample coverage of the tube surface for fast derodding. A larger model of the rotary straightener is used for tube straightening and some skin hardening jobs.

This larger machine straightens copper and brass tube in lengths up to 30 ft. Diameters range from 3/8 to 7/8 in. and walls vary from 0.007 to 0.080 in. Specifications usually call for straightness of no

Derod on straightener . . .

Turn Page



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Precision Stampings in a Hurry

Lead Alloy Products Co. is organized for speed on both long and short runs. Plant, personnel and equipment are set up to get into production immediately on your emergency jobs.

We supply non-ferrous parts to your specifications: small precision stampings, special gaskets, washers, sealing rings, laminations, soldering or brazing preforms.

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Free engineering service and no contracts required

AUTOMOBILE FRONT FENDER MASTER MODEL

REN-ITE is a modified Epoxy thermosetting resin for use as a tooling plastic without application of heat or pressure for general tooling applications.

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We invite you to try Ren-ite products in your tooling program. Write for further information and price schedules on complete Ren-ite line.

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C

ELECTRIC FURNACE

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ARE FOUNDRY ENGINEERED

Regardless of the type of product you make — if you are interested in strength, toughness, uniform structure, resistance to fatigue, long life, lower machining and lower assembly costs — you'll be interested in C Steel Castings. The point is that they are sound, clean, true to pattern castings that by alloy and heat treating possess an almost unlimited range of mechanical properties.

Why Not Investigate?

Perhaps by cooperating with your engineers in details of design and pattern construction we may be able to save you both machining and assembling costs.

CRUCIBLE STEEL CASTING CO.
LANSDOWNE, PENNA.

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DANGER
HIGH VOLTAGE
NOTICE
THIS GATE MUST BE CLOSED BEFORE THE ELEVATOR CAN BE OPERATED
ALL HANDS HELP KEEP THIS PLANT SAFE AND CLEAN
A FIRE MIGHT PUT EVERY ONE OUT OF WORK
FIRE EXIT
CAUTION KEEP OUT FROM UNDER CRANE LOADS
CAUTION DON'T CLEAN, OIL, REPAIR MACHINERY WHILE IN MOTION
THINK THE BEST SAFETY DEVICE IS A CAREFUL WORKER
DANGER WEAR GOGGLES WHEN CHIPPING OR GRINDING
SAFETY FIRST AT ALL TIMES NO SMOKING
DANGER WATCH YOUR STEP
THINK A FIRE TO DAY NO JOB TO MORROW
DANGER KEEP AWAY
NOTICE PRIVATE GROUNDS KEEP OFF
CAUTION THIS DOOR MUST BE KEPT CLOSED

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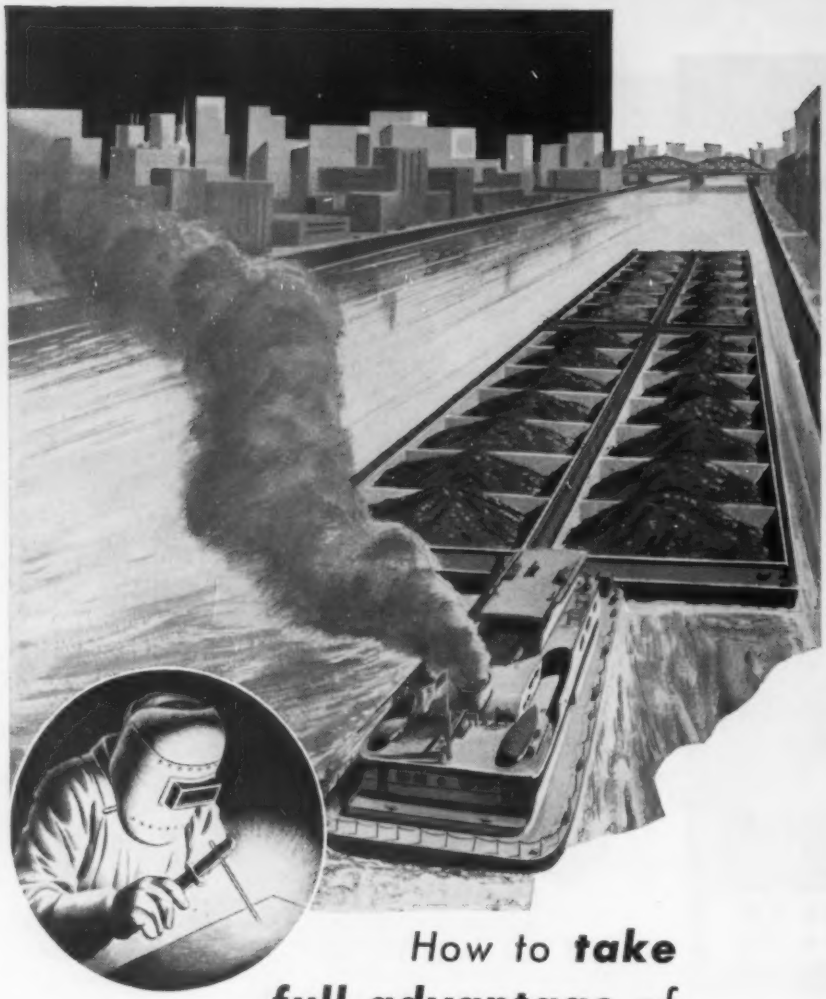


How to **take**
full advantage of
high-strength, low-weight steels

Modern river barges move everything from ore to automobiles with low cost efficiency. Much of the credit belongs to this combination: *High-strength, low-weight steels* fabricated with *weld metal of outstanding physical qualities.*

Whenever you're working with this type steel—and you're out to make the most of its high-strength, low-weight ratio—trust Arcos Low Hydrogen Electrodes to deliver sound weld metal for successful results. Rigid quality controls in manufacture, plus the widest electrode selection in the field, are your Arcos guarantee of the right electrode for every application. And once on the job, the high ductility and impact strength of the weld metal will give you the time and money-saving advantages of top performance and long equipment life. In the meantime send for your free copy of "The ABC's of Welding High Tensile Steels".

ARCOS GRADE	A. W. S. SPEC.
Tensilend 70	E7016
Tensilend 100	E10016
Tensilend 120	E12015
Manganend 1M	E9015
Manganend 2M	E10015
Nickend 2	E8015
Chromend 1M	E8015
Chromend 2M	E9015

ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Penna.

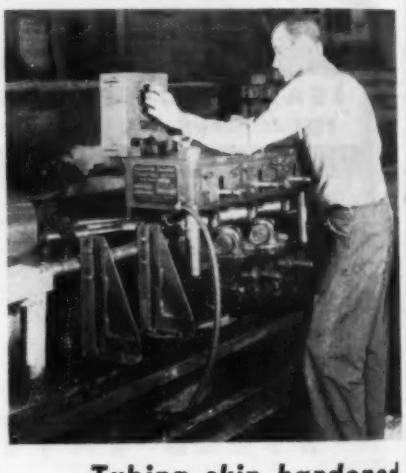
WELD WITH ARCOS
LOW HYDROGEN ELECTRODES

more than 0.010 in. deviation per ft. Reliance variable speed control aids in varying production speed of the machine to suit tube metal characteristics and order requirements.

Raise Skin Hardness

Skin hardening of dead soft copper tube that has been drawn to size and annealed is also done on this machine. One pass raises the Rockwell 15-T hardness from 53 to at least 59. Using the machine for skin hardening relieves the work load on the already busy draw benches.

Better than 100,000 lb of tubing are straightened monthly on the larger machine while maintaining full protection tube roundess and obtaining the desired burnishing.



. . . Tubing skin hardened

Construction:

Lightweight steel construction cuts building costs.

Box-shaped steel girders formed by welding two sections of hot-rolled channel are helping cut building and construction costs. Made from lightweight channels, the girders were used recently in constructing the new Fountain Inn-Simpsonville High School near Spartanburg, S. C.

Credit for the new construction idea goes to a Greenville architect, W. E. Freeman, Jr., of W. E. Freeman & Associates. Greenville Steel & Foundry Co. fabricated the new structural steel girder,

Technical Briefs

Prestressing secret of success of low cost construction method . . .

known as prestressed Junior Channel rigid bents.

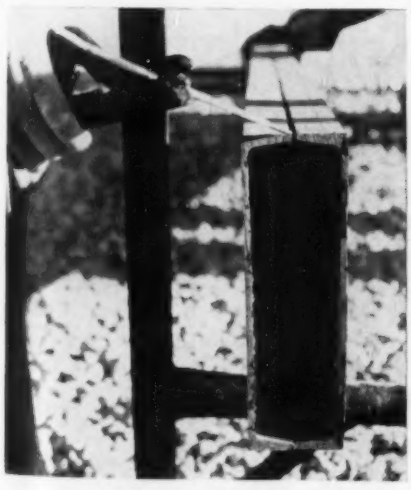
Start With Channel

The box-shaped steel girders are formed by welding together two sections of ten inch, 6½-lb Jones & Laughlin hot-rolled channel.

The thirty bents necessary for the first section of the main building were formed in two sections and field-connected by welding on the ground before erection. Columns were mitred to the 72-ft beams and the 6-foot, tapered overhang beams were butted on. Interior pipe columns were welded in place.

Prestressing Helps

Secret of the method's success was prestressing. Each column was spread three-fourths of an inch at the bottom when it was welded to the beam. When each bent was hoisted for erection by means of two cables, the bent's own weight brought the outside columns back to perpendicular, fitting anchor bolts exactly (only one man was needed at each anchor point) and at the same time a camber of ⅝-in. per 30-ft span was obtained by resulting tension. This camber will be offset by weight of the roof.



Welded box girder . . .

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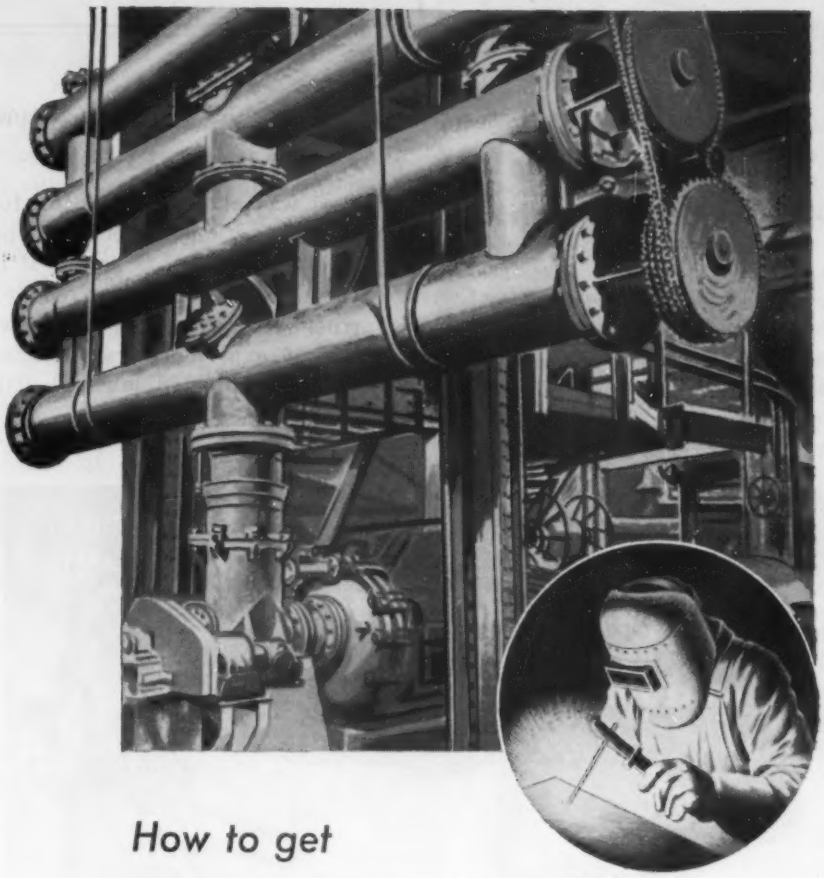

How to get corrosion-resistant ***continuity*** *when welding stainless clad steels*

When you weld clad materials you are welding dissimilar metals. The weld metal will be a combination of the two base materials plus the filler metal of the electrode.

Proper electrode selection is an essential step in developing the required corrosion resistance in a weld. Just as important as the selection of electrodes in clad welding are correctly designed joints and proper heat treatments.

Arcos long experience in welding stainless and the clad materials can guide you in the selection of the proper electrode and welding procedure necessary for successful fabrication. Take advantage of the rigidly controlled qualities of Arcos electrodes to get consistently sound welds at a low overall cost.

ARCOS CORPORATION, 1500 South 50th Street, Philadelphia 43, Pennsylvania

WELD WITH ARCOS STAINLESS ELECTRODES

Box-shaped girders assembled from two hot-rolled channel sections . .

The 30 bents in the first section of the main structure went up in only 21 working hours, including welding of the center joint which was done with work on the ground.

Can Be Left Exposed

Cost was about $29 per ton for field connections, erecting and plumbing the first 30 bents. It is expected this cost can be reduced further on remaining work because of experience gained thus far. The completed job will utilize 164 tons of steel. Twenty-five tons were used in initial section.

Another cost-cutter is the fact that bents can be left exposed in the interior with only painting necessary. The bottom weld of the beam was ground flush as was the inside weld on the columns. The top and outside welds will be covered by the roof and brick work.

Permanent outside spacers between bents were formed of single 10-in. Junior Channel sections bolted to studs welded onto each bent. Temporary wooden spacers were used in conjunction with cables to true the beams, although little adjustment was needed.

. . . Weld joins bents

Communications:

Intercom makes crane control easier in steel plant.

Communication between crane operators and ground crews in a steel plant has always been a problem, from standpoint of both safety and efficiency. In modern melt shops, the problem has been aggravated by the introduction of air-conditioned crane cabs with permanently closed windows.

U. S. Steel Corp. has come up with the answer at its Fairless Works openhearth shop: A two-way frequency-modulated (FM) tele-

phonic system that enables workers on the charging and pouring floors to direct crane traffic with greater efficiency.

Intercom Saves Time

In the system set up at Fairless Works, each of three cranes on each side of the shop is equipped with a wall-mounted loudspeaker and a ceiling-mounted microphone adjustable to a level convenient to the operator.

Similar installations are set up on the ground—six on the charging side and six on the pouring side. "Satellite" or remote stations located on building columns supplement the regular ground installations.

Since the system was established waste crane travel has been cut to a minimum, and ground crews no longer find it necessary to move from their normal work areas to attract attention of crane operators.

Uses Regular Circuits

Existing electrical circuits are utilized; no additional wiring is needed. "Telecrane" can operate on either AC or DC, but in isolated areas, where power lines are not practical, circuits that operate on storage batteries may be used. Practical range is 1 mile. Clear two-way communication on as many as 10 channels may be carried on without "cross-talk" interference.

Fairless Works recently installed similar equipment in the batch annealing building and the raw coil storage bulding. The system was engineered by Mine Safety Appliances Co., Pittsburgh. All components were made by Union Switch and Signal Div. of Westinghouse Air Brake Co.

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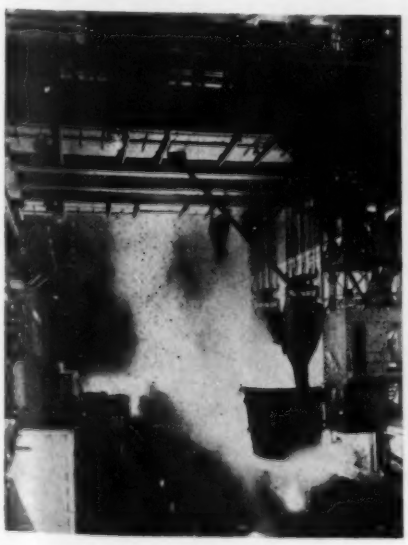
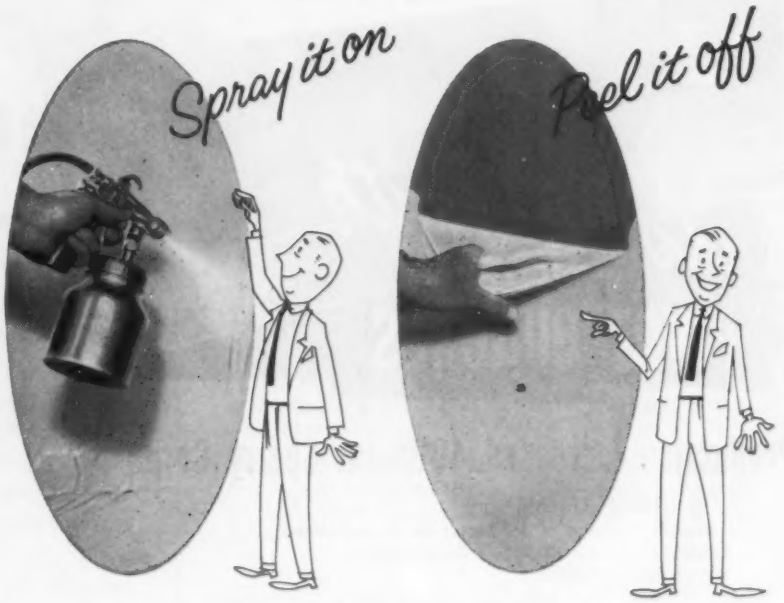
Charging floor floorman . . .



. . . Directs 450-ton crane



new **PEEL FILMITE** removes dried over-spray from paint booths in minutes!

Using regular spray equipment, spray DuBois PEEL FILMITE over clean booth. As soon as walls are dry, your booth is ready to operate. When overspray accumulates, score the coating; peel off big sheets at a time.

PEEL FILMITE stays flexible, doesn't age. Contact DuBois today for details on PEEL FILMITE, the new high strength, peelable plastic film! It cuts costs . . . cuts labor . . . it's

Flame proof — Fire proof!

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Hydraulic Fluids:

Nonflammable type fluid resists fire.

Where high temperatures are involved, a nonflammable type hydraulic fluid can pay off in case of fire through its resistance to burning.

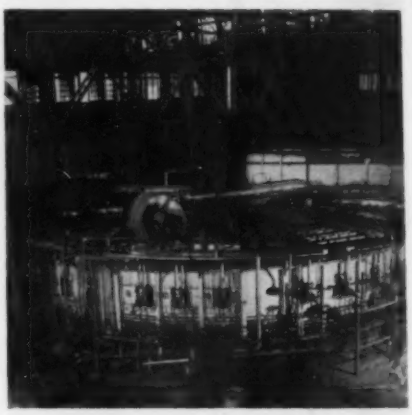
A typical example comes from the Spang-Chalfant Div. of The National Supply Co., Ambridge, Pa. Several months ago a break in the hydraulic line (1000 psi) of the mechanism for handling steel billets at a 55-ft Hagan rotary furnace sprayed fluid on metal at a temperature of 2250° F.

The resulting fire burned out the electrical furnace controls and stop-

Plant Planning:

Reduces fire hazard . . .

Removing hot billet . . .



. . . From rotary furnace

. . . Hydraulic lines exposed

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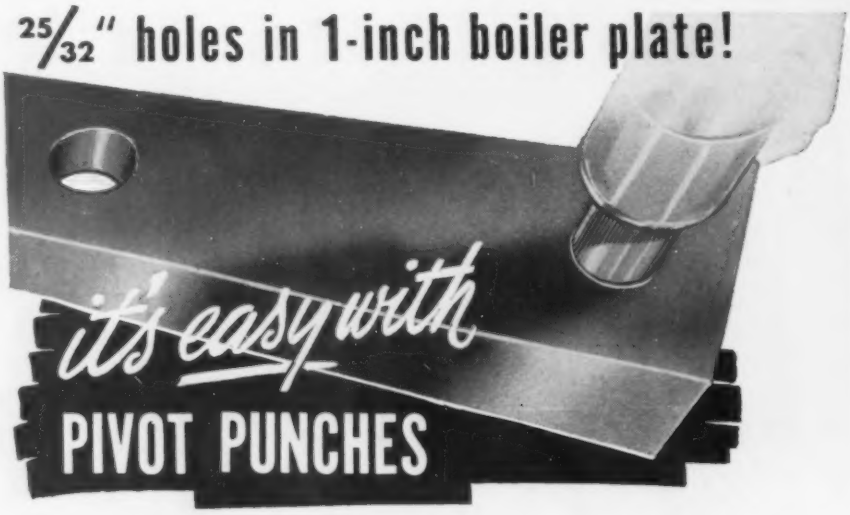
25/32" holes in 1-inch boiler plate!



Production Increased 400% at Sperry Corp.

MR. JOHN P. PHELAN,
General Foreman of Machining at New Holland Machine Division of Sperry Corporation, Lancaster, Pa. says:

"We are perforating 1-inch boiler plate with straightground whip-sleeved Pivot Punches of 25/32" diameter. Although this exceeds conventional ratio we are finishing 100 pieces with 2 holes per piece in .868 hours. Formerly, with drilling and deburring, the same production required 3.45 hours.

"We are also punching .104 dia. holes in .187 hot rolled steel.

"These are two of the many operations that we formerly drilled until we changed to Pivot Punches."

Send for complete catalog with price lists. See how you can increase production with Pivot Punches . . . at lower prices than your own cost to manufacture. Write Dept. I.A.

tondra-treated FOR EXTREME HARDNESS

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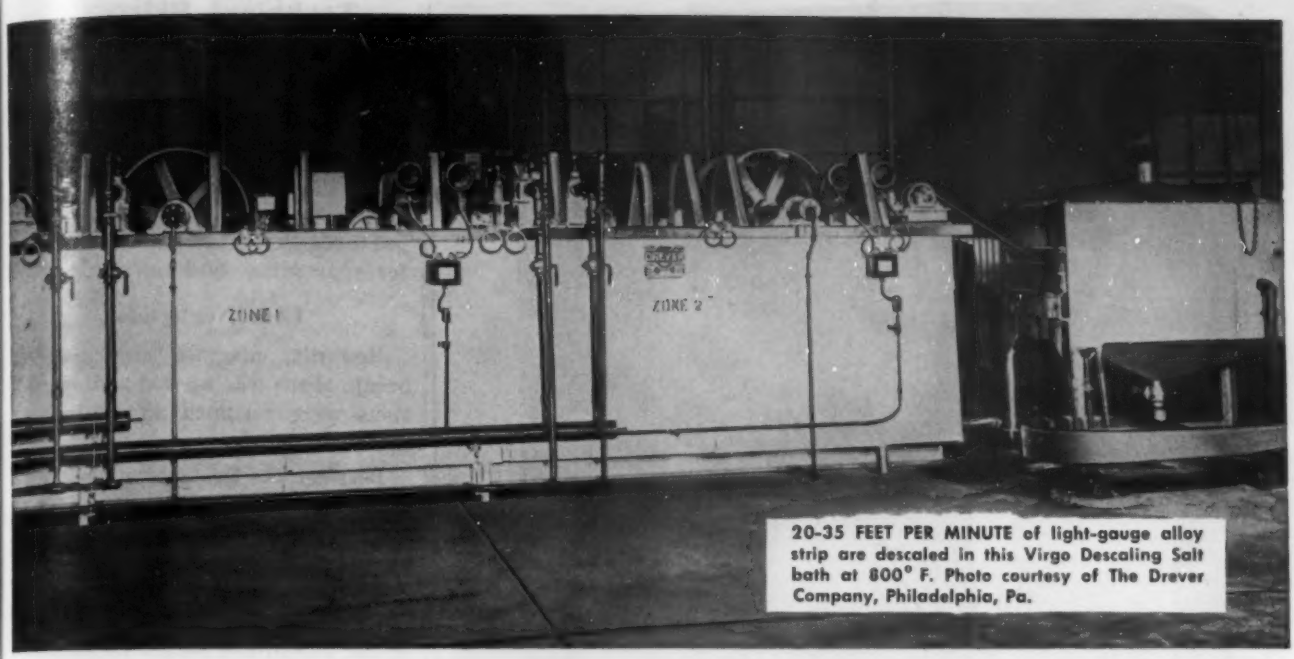

20-35 FEET PER MINUTE of light-gauge alloy strip are descaled in this Virgo Descaling Salt bath at 800° F. Photo courtesy of The Drever Company, Philadelphia, Pa.

HOW TO

DESCALE 5½ MILES OF STRIP PER DAY

You can get clean bright surface in ONE operation with VIRGO® DESCALING SALT

Straight chrome and chrome nickel strip flow through this continuous descaling-annealing unit, at 25-35 feet per minute—about 5½ miles per 24 hour day.

The light-gauge strip is descaled in one pass through a bath of molten Virgo Descaling Salt at 800° F., after annealing. The process yields a chemically clean, bright surface with no pitting, etching or metal loss.

Large or small, your plant can show real production-time savings with the Hooker Process using Virgo Descaling Salt, or with the Virgo Molten Cleaner process. Use these processes on stainless and alloy steels; castings; forgings; fabricated parts; material to be salvaged. Both processes are non-electrolytic . . . non-toxic . . . employ simple equipment . . . do not require close supervision . . . are easily adapted to your production methods. For full details, mail coupon or write us today.

For Fast, Safe, Low-Cost DESCALING

VIRGO® DESCALING SALT—Producers and fabricators of stainless and alloy steels use Virgo® Descaling Salt to quickly remove scale produced by hot rolling, forging, extruding, casting, annealing.

VIRGO® MOLTEN CLEANER—Quickly, positively desands and degraphitizes castings; removes grease, dirt, chemicals, paint, enamel, rubber atmospheric corrosion and other impurities.

BOTH HOOKER PROCESSES are backed by 15 years' experience in salt bath descaling and cleaning. Engineering, research and on-site operating assistance are part of our service.

SEND FOR THESE BULLETINS
They tell the whole story on Virgo Descaling Salt and Virgo Molten Cleaner—what they are, how they work, their advantages, equipment involved, and the Hooker services you enjoy as a user of the process.

Hooker Electrochemical Company
33 FORTY-SEVENTH ST., NIAGARA FALLS, N. Y.

Please send me Bulletins checked: Virgo Descaling Salt ☐ Virgo Molten Cleaner ☐

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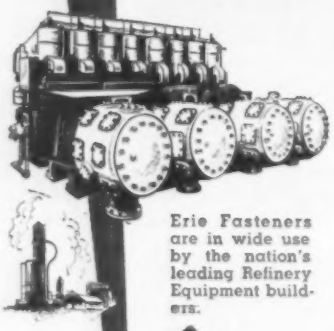
For DEPENDABILITY

ERIE the correct fastener for the job!



Erie Fasteners are in wide use by the nation's leading Refinery Equipment builders.

You can rely on over 40 years of experience in producing bolts, studs and nuts designed to withstand the effects of high and low temperatures, high stresses, fatigue and corrosion. Modern facilities enable our skilled craftsmen to produce to your specifications bolts, studs and nuts, precision machined and heat treated in carbon, alloy, stainless steel and non-ferrous metals.

These Erie Products prove their quality every day in the railroad, chemical, petroleum and automotive industries; on farm, construction and industrial equipment and heavy machinery. Send your design and material specifications to us . . . we will make for you the Correct Fastener for the Job.

A SUBSIDIARY OF Barium STEEL CORPORATION

ERIE BOLT and NUT CO.

ERIE • PENNSYLVANIA

STUDS • BOLTS • NUTS
ALLOYS • STAINLESS
CARBON • BRONZE

Representatives in Principal Cities.

. . . Pays off in lower maintenance costs, less danger of fire . . .

ped production of seamless tubing for approximately 6 hours.

Loss Negligible

Recently, after a similar line break, there was no fire and operations were resumed almost immediately. The loss was negligible.

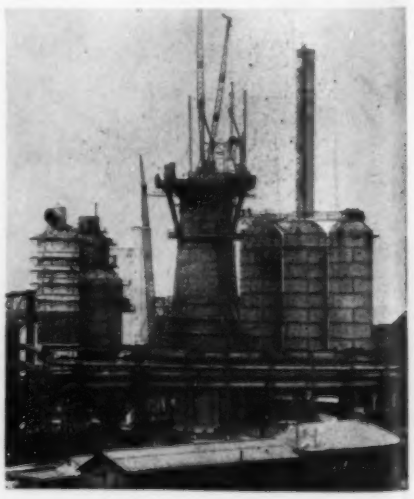
Between the two occurrences, the plant had equipped the handling mechanism with Pydraul F-9, nonflammable type pressure transfer fluid made by Monsanto Chemical Co. The fire-resistant fluid is now in the second and larger furnace.

Steelmaking:

New blast furnace will have built in cleaners.

Improved cleaning devices will be built in a new blast furnace now being built by American Steel & Wire Div. of United States Steel Corp., at Cleveland. The big 229-ft high facility will include gas washers and scrubbers and will be one of the most modern setups for prevention of air and water pollution.

Gas produced by the furnace passes from the dust catcher to the washer where it is "scrubbed" with water. It then passes through a secondary cleansing process to "fine



Gas scrubbed clean . . .

clean" it before traveling to the stoves which are used to heat the air going into the blast furnace and to a nearby boiler house for the purpose of generating steam.

Ore, coke and limestone are charged into the furnace at the top, and the air, heated to between 900° to 1200°F, is blown in at the bottom. The furnace is expected to be ready for lighting by early summer.

New Books:

Metallurgical dictionary covers much ground.

A comprehensive metallurgical dictionary recently published should prove of considerable aid to engineers, metallurgists and many others in the metalworking industry.

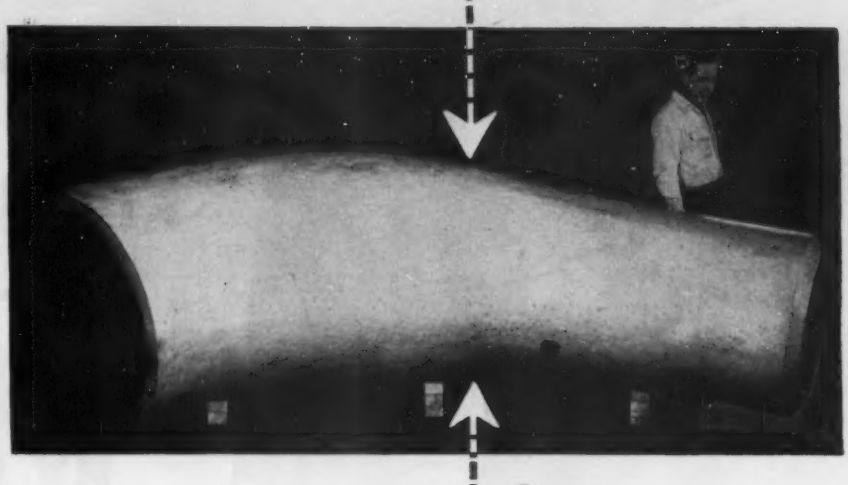
"Metallurgical Dictionary," by J. G. Henderson. Contains over 5000 definitions and descriptions covering the most essential terms in both production and physical metallurgy. Entries are cross-referenced. Reinhold Publishing Corp., 330 West 42nd St., New York 36. $8.50.

"How to Make a Speech That Listeners Like," by R. C. Borden. Ever had to sit through a long, dull speech? Here's a little booklet with common sense advice for speakers. It makes good reading rack material, too. Advice is brief and to the point. Tells how to spark audience interest, organize material, present material your audience can understand, and reach conclusions that ask for action. The Economics Press, Inc., Box 460, Montclair, N. J. 10 copies, 30¢ each. 20 p.

"Fresh Water from the Ocean," by C. B. Ellis. Analyzes the possibility of drawing fresh water from the ocean on a grand scale—1000 million gal per day. Weighs the economics, evaluates various methods in terms of costs. Aim of the book is to encourage thought on basic problems involved. The Ronald Press Co., 15 East 26th St., New York 10. $5.00. 217 p.

DURALOY

This Casting



Casting weight
21,000 pounds

Shipping weight
14,000 pounds

Alloying Elements
38% Ni., 18% Cr., 2% Mo.

Set a Record!

It's the weight rather than the Ni-Cr content that's the record.

We've cast many a piece with such a high Ni-Cr combination. But this represents the largest casting we have ever made. And it took careful scheduling of our entire battery of electric furnaces, with a double melt from two smaller furnaces.

Next followed a thorough X-ray for hidden flaws with our 400,000 volt unit. Then rough-finishing to specifications.

The significant fact is that this casting, the first of this size we have ever produced and destined for a most important high priority processing job, passed inspection with flying colors. *There was no reject here.* It is indicative of the skill of our metallurgists and foundrymen in turning out high alloy castings.

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FORM TOOLS

the Iron Age
FOUNDED 1855
Markets and Prices

THE IRON AGE SUMMARY...

- **Inventory correction paving way for upturn**
- **Labor bargaining may change consumer views**
- **Both scrap prices and operating rate advance**

Inventory—the same factor that caused a depressed steel market during the first quarter —will give it a shot in the arm during the second quarter.

A close check of producers and consumers this week furnishes this inventory picture:

- The stampede toward inventory correction (reduction) continues to dominate the market. This may hold true for several weeks.
- Yet drastically shorter buying policies are hastening the correction. And there is increasing evidence that more firms are reaching desired inventory levels, either overall, or on certain products.
- Some manufacturers are known to be using steel two or three times as fast as they are buying it.
- Mills continue to report gradual pickup in number of new orders, a vital market factor.
- Individual orders are unusually small, indicating cautious buying within rigid limits.
- There are more "rush" orders. Rush orders mean that stocks have shrunk below safe operating levels and steel is needed quickly to keep production going.

This adds up to substantially more steel buying in the not-too-distant future—probably within the next 6 or 8 weeks.

Labor is another factor that will tend to strengthen the steel market in the second quarter. Most contracts expire June 30, and the union must serve notice of intention to reopen on or before May 1.

This 2-month period of tough bargaining might convince some manufacturers that they have trimmed inventories too close. The same inventory that looked very big in March might look pitifully small in June—if steel production seems threatened by a strike.

Sharply competitive conditions in the industry have undoubtedly weakened labor's bargaining position. In the past 6 months producers have shifted emphasis from production to efficiency and cost reduction. And they will hardly be subjected to as much pressure from customers as they have felt during the past few years.

Still the union will press hard for its program (still to be decided officially by the International Wage Policy Committee) of higher pensions, more social insurance, higher wages and guaranteed annual wage.

Chances are it will win compromise concessions on pensions and social insurance. But it will gain no more than a token increase (if that) on wages. And it probably won't get past first base in its bid for a guaranteed annual wage—despite publicity and spreading unemployment which makes this issue potentially hotter than a firecracker.

Scrap prices rose this week for the second week in a row, after declining steadily since the first of the year. THE IRON AGE Steel Scrap Composite Prices rose 16¢ a ton to $24.33.

Steelmaking operations this week are scheduled at 68.0 pct of rated capacity, unchanged from last week's rate which was revised upward 1.5 pct. There are indications the ingot rate may have just about hit rock bottom.

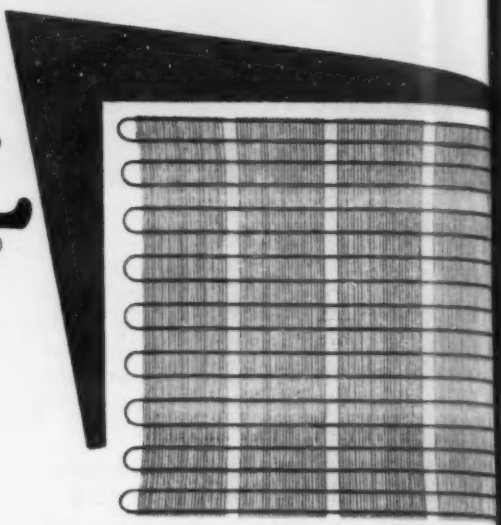
Steel Output, Operating Rates

	This Week†	Last Week	Month Ago	Year Ago
Net Tons Produced (000 omitted)	**1,621**	**1,624**	**1,686**	**2,190**
Ingot Production Index (1947—49=100)	**100.9**	**101.1**	**105.0**	**136.3**
District Operating Rates				
Chicago	76.0	75.5	78.5	108.5
Pittsburgh	77.0	78.0*	83.0	79.0
Philadelphia	59.5	61.5*	67.0	94.0
Valley	62.0	52.0*	65.0	104.0
West	69.5	66.5*	70.0	104.0
Detroit	83.0	83.0*	53.0	107.0
Buffalo	67.0	69.5	63.5	94.0
Cleveland	57.0	57.0	64.0	96.5
Birmingham	75.5	78.0	80.0	99.0
S. Ohio River	70.0	70.0	75.0	88.0
Wheeling	73.0	81.0*	85.0	102.0
St. Louis	62.5	52.0	45.5	80.5
East	50.0	74.5*	53.0	110.5
Aggregate	**68.0**	**68.0***	**70.5**	**97.0**

Per cent of capacity for weeks in 1954 is based on annual capacity of 142,330,410 net tons as of Jan. 1, 1954. Per cent of capacity for last year is based on annual capacity of 117,547,470 tons as of Jan. 1, 1953.
* Revised.
† Tentative.

Now... Condensers can be Made with 216 Simultaneously Fed Strands of

CONTINENTAL® COIL WIRE



• By using Continental Coil Wire in exact specification, packed in th NEW Drum Container, 216 strands can be simultaneously fed into speci high-speed welders to make condensers for the refrigerator trade. Such the experience of the Seeger Refrigerator Company where Continent Wire specialists supplied not only the right wire, but also the right type wire package—to do the job right.

Photos courtesy of the Seeger Refrigerator Company

OUT OF NEWLY DESIGNED DRUM CONTAINERS

INVESTIGATE THE ADVANTAGES OF CONTINENTAL'S NEW DRUM TYPE COIL WIRE PACKAGE

- 580 pound catchweight coils of single length wire in this new drum container are ideally suited for a continuous feed operation.
- New drum packaging has reduced customer's machine "down" time by as much as 30%.
- New drum package eliminates handling of bare coils of wire.
- No tie wires to contend with.
- Drums are ideally suited for storage—they stack well.
- Excellent protection against rust or surface corrosion—wire is clean and bright when used.
- Wire does not have to be oiled for protection—no messy and slippery storage area.

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PRODUCERS OF Manufacturer's Wire in many sizes, shapes tempers and finishes, including Galvanized, KOKOTE, Flame-Sealed, Coppered, Tinned, Annealed, Liquor Finished, Bright, Lead Coated, and special wire. ALSO, Coated and Uncoated Steel Sheets, Nails, Continental Chain Link Fence, and other products.

Markets at a Glance

Cut Pig Iron Price . . . Mystic Iron Works, Everett, Mass., has trimmed $1.75 from its pig iron prices. Second quarter price for foundry iron is $61.25 per gross ton; for malleable it's $61.75. The firm bases prices on raw materials costs for the preceding quarter.

More Steel For Autos . . . Shipments of 1,122,505 tons of finished steel to the automotive industry in January 1954 were the highest since last September. This figure represented a gain of 300,000 tons over December 1953. Shipments to all industries in January were 43,000 tons higher than the previous month, hitting 5,727,600 net tons as reported by American Iron and Steel Institute.

Construction Up In Midwest . . . Galvanized sheet is still moving well in midwestern states. This activity, like that in merchant wire products, is a result of the unexpected boom in new housing starts in the area. Minneapolis, like Chicago, is getting a lot of building, though there is more commercial and industrial than home building. Total of all categories (industrial, commercial and home) is pushing this year's building rate over last year's.

Re-start Openhearth . . . Granite City Steel Co. put a third openhearth furnace in operation last week. For the past 2 months, the company's openhearths have been operating at a reduced rate due to heavy inventories of ingots, slabs and coils.

Freight Revenue Off . . . Loading of revenue freight for the week ended Mar. 20, 1954, totaled 609,959 cars according to reports from Assn. of American Railroads. This was a decrease of 91,106 cars or 13 pct below the corresponding week in 1953. Loading of revenue freight increased 0.01 pct for the preceding week.

Appliance Sales Up . . . A 5 pct increase in the sale of electric appliances was announced by Westinghouse Electric Appliance Div. for January and February. The company expects 1954 appliance sales to be 15 pct greater than last year which was the Appliance Div.'s best.

Gear Index Down . . . Production index of the gearmaking industry for February 1954 has decreased 1.4 pct from the previous month. February's index stood at 165.1 pct.

Steel Sheet Active . . . Sheets are still moving in good shape, and some midwestern mills are reporting some rather good appliance orders. One appliance firm is doing about 75 pct of the sheet steel buying it was doing a year ago, but continues to move upward in its requirements. This shows it's still buying to fill out a strong raw materials inventory, but holes in that inventory are developing faster due to a higher production rate than was forecast in January of this year.

Wide Aluminum Sheets . . . Production of 48-in. wide corrugated aluminum farm roofing and siding in two pitches, 1¼-in. and 2½-in. in standard lengths up to 12 ft was announced last week by Kaiser Aluminum & Chemical Co. The sheet is available in .019-in. and .024-in. gages. Recent additions to the rolling mill at the company's Trentwood, Wash., plant have made the wide sheets possible.

Tube, Wire Show Gain . . . Oil country tube is still a good item with Midwest mills, though there's a little more space available than in late 1953. Wire products, particularly in merchant category, are moving up again.

New Locomotives . . . Railroad installation of new locomotives during February added up to 80 units, bringing the total for 1954 to 239 compared with 329 for the first 2 months of last year. As of Mar. 1, Class I railroads had 521 locomotives on order with builders as compared with 1069 on the same date last year, according to Assn. of American Railroads.

Prices At A Glance

(cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	4.634	4.634	4.634	4.376
Pig Iron (gross ton)	$56.59	$56.59	$56.59	$55.26
Scrap, No. 1 hvy (gross ton)	$24.33	$24.17	$23.83	$44.25
Nonferrous				
Aluminum, ingot	21.50	21.50	21.50	20.50
Copper, electrolytic	29.875	29.875	29.75	31.00
Lead, St. Louis	13.30	12.80	12.30	13.30
Magnesium, ingot	27.75	27.75	27.75	27.00
Nickel, electrolytic	63.08	63.08	63.08	63.08
Tin, Straits, N. Y.	95.50	95.00	86.75	$1.20
Zinc, E. St. Louis	10.25	9.75	9.75	11.00

Boosted U.S. Buying Will Aid Metals

White House directs upward revision of stockpile goals . . . Lead, zinc, tin said to be on new list . . . U. S. buys 100,000 tons of Chilean copper—By *R. L. Hatschek.*

The White House has directed mobilization officials to provide a new look in stockpiling through new goals and heavier procurement. Actually aimed at long-term military security, it comes as good news to hard-pressed metal producers.

In a directive to Office of Defense Mobilization, President Eisenhower authorizes a thorough review of the whole stockpiling program which began with a $4.2 billion goal and has since been doubled. It's about 50 pct complete.

Eases Pressure . . . Current action has been taken with the full backing of the Cabinet. It is based on a preliminary study by the Minerals Policy Committee and follows its recommendations.

It looks as if the White House has succeeded in easing pressures temporarily in several directions, including the extension of new hope to western delegations in Congress, who have been clamoring for varied legislation to relieve the mining industry. Proposals range from subsidies to higher tariffs.

It seemed certain that the White House would soon have to face the tariff question in any event. A lead-zinc investigation is now under way and betting is that the Tariff Commission will recommend an increase in import duties.

Buy Lead, Zinc, Tin . . . As roughly outlined by the presidential directive, some 35 to 40 still unidentified materials, out of the more than 75 now classified as strategic, will figure in the reshuffling of stockpiling goals.

Insiders say that lead, zinc, and tin will be included in the buying program, although previous goals for lead and zinc have been met and by June the government will be holding 40,000 tons of tin above the original objective.

White House action was taken on the assumption that "the Soviets now have the capability of attack upon the United States."

In this case, it is pointed out, access to foreign sources might be cut off and in addition, some of our own mines and processing plants might be knocked out.

Start Immediately . . . Director Arthur S. Flemming of ODM is ordering the review be started at once in preparation for the issuance of new directives to General Services Administration, which does the actual buying.

It will probably take two weeks or more to complete the review in view of the "considerable magnitude" of the new program. No estimate of the cost has been made.

Congress may also have to take a new look at the stockpiling budget. Last week, a House committee turned down a $27 million GSA request for contract liquidation but left the door open for supplemental funds to meet actual needs.

May Upgrade Materials . . . Another part of the program calls for upgrading and refining of strategic metals, minerals, and other materials now held in the stockpile so they would be more readily usable.

A surplus problem may be involved in buying the more readily available materials and upgrading of existing stocks. But ODM is committed to a policy of not dumping materials, particularly those which would depress the market.

Buy Chile Copper . . . Federal buyers are tying down details of a new agreement whereby the U. S. will purchase 100,000 tons of Chilean copper for stockpiling at the world market price.

Involved in the arrangements are officials of GSA and the two major producers in Chile, owned by Anaconda Copper Mining Co. and Kennecott Copper Corp.

Surplus Still Looms . . . Chile still has to enact legislation altering the monetary exchange rate and giving the copper producers certain other breaks that were included in original conditions laid down by the U. S. And there's still a matter of about 80,000 tons left in the Chilean surplus that is to be sold at the going world price.

Immediate reaction in London was a drop in the copper price. But there still is enough demand for scrap to push up domestic dealer buying prices and smelter and ingot maker buying prices.

NONFERROUS METAL PRICES

(Cents per lb except as noted)

	Mar. 24	Mar. 25	Mar. 26	Mar. 27	Mar. 29	Mar. 30
Copper, electro, Conn.	29.75–30.00	29.75–30.00	29.75–30.00	29.75–30.00	29.75–30.00	29.75–30.00
Copper, Lake delivered	30.00	30.00	30.00	30.00	30.00	30.00
Tin, Straits, New York	92.50	94.50	95.00	....	95.50	95.50*
Zinc, East St. Louis	9.75	9.75	9.75	9.75	10.25	10.25
Lead, St. Louis	12.80	12.80	13.05	13.05	13.30	13.30

Note: Quotations are going prices
*Tentative

CARBON DETERMINATION

Alloymet 2115

A product of close Metallurgical CONTROL for the production of stainless steel and alloyed iron

From the original formula to the ingot, control is the most important item in our book. *Alloymet 2115* and its companion alloys are products pre-alloyed to take the "headache" out of the melting department. A single trial in your mill will make you an *Alloymet* "regular."

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ALTER COMPANY
Alloy Metal Division

1701 Rockingham Road, DAVENPORT, IOWA
Phone 6-2561 Teletype DV 588

Nonferrous Prices

(Effective Mar. 30, 1954)

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. ship. pt. frt. allowed)

Flat Sheet: 0.136 in. and thicker, 2S, 3S, 33.9¢; 4S, 36.0¢; 52S, 38.2¢; 24S-O, 24S-OAL, 37.0¢; 75S-O, 75S-OAL, 44.7¢; 0.081-in., 2S, 3S, 35.1¢; 4S, 37.7¢; 52S, 39.9¢; 24S-O, 24S-OAL, 38.4¢; 75S-O, 75S-OAL, 46.9¢; 0.032-in., 2S, 3S, 37.0¢; 4S, 41.8¢; 24S-O, 24S-OAL, 46.9¢; 75S-O, 75S-OAL, 58.4¢.

Plate, ¼-in. and Heavier: 2S-F, 3S-F, 32.4¢; 4S-F, 34.5¢; 52S-F, 36.2¢; 61S-O, 35.6¢; 24S-O, 24S-OAL, 36.9¢; 75S-O, 75S-OAL, 44.3¢.

Extruded Solid Shapes: Shape factors 1 to 5, 36.5¢ to 82.8¢; 12 to 14, 37.2¢ to 99.0¢; 24 to 26, 39.9¢ to $1.29; 36 to 38, 47.2¢ to $1.89.

Rod, Rolled: 1.064 to 4.5-in., 2S-F, 3S-F, 43.8¢ to 37.2¢; cold-finished, 0.375 to 3.449-in., 2S-F, 3S-F, 47.6¢ to 39.3¢.

Screw Machine Stock: Rounds, 11S-T3, ½ to 11/32-in., 59.6¢ to 47.0¢; ⅜ to 1½-in., 46.6¢ to 43.8¢; 1 9/16 to 3-in., 42.7¢ to 39.9¢. Base 5000 lb.

Drawn Wire: Coiled 0.051 to 0.374-in., 2S, 44.1¢ to 32.4¢; 52S, 53.4¢ to 39.1¢; 17S-T4, 60.1¢ to 41.8¢; 61S-T4, 53.9¢ to 41.3¢.

Extruded Tubing: Rounds, 63S-T5, OD 1¼ to 2-in., 31.6¢ to 60.7¢; 2 to 4 in., 37.7¢ to 51.1¢; 4 to 6 in., 38.2¢ to 46.6¢; 6 to 9 in., 38.7¢ to 48.8¢.

Roofing Sheet: Flat, per sheet, 0.032-in., 42¾ x 60 in., $2.838; x 96 in., $4.543; x 120 in., $5.680; x 144 in., $6.816. Coiled sheet, per lb, 0.019 in. x 28 in., 30.8¢.

Magnesium

(F.o.b. mill, freight allowed)

Sheet & Plate: FS1-O ¼ in., 56¢; 3/16 in., 57¢; ⅛ in., 60¢; 0.064 in., 73¢; 0.032 in., 94¢. Specification grade higher. Base 30,000 lb.

Extruded Round Rod: M, diam ¼ to 0.311 in., 77¢; ½ to ¾ in., 60.5¢; 1¼ to 1.749 in., 56¢; 2½ to 5 in., 51.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes: Rectangles: M. In weight per ft, for perimeters less than size indicated; 0.10 to 0.11 lb, 3.5 in., 65.3¢; 0.22 to 0.25 lb, 5.9 in., 62.3¢; 0.50 to 0.59 lb, 8.6 in., 59.7¢; 1.8 to 2.59 lb, 19.5 in., 56.8¢; 4 to 6 lb, 28 in., 52¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 lb and heavier, 30,000 lb.

Extruded Round Tubing: M, 0.049 to 0.057 in. wall thickness: OD, ¼ to 5/16 in., $1.43; 5/16 to ⅝ in., $1.29; ½ to ⅝ in., 96¢; 1 to 2 in., 79¢; 0.165 to 0.219 in. wall: OD, ⅝ to ¾ in., 64¢; 1 to 2 in., 60¢; 3 to 4 in., 59¢. Other alloys higher. Base, OD: Up to 1½ in., 10,000 lb; 1½ to 3 in., 20,000 lb; over 3 in., 30,000 lb.

Titanium

(10,000 lb base, f.o.b. mill)

Commercially pure and alloy grades; Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel, Monel, Inconel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	86½	67½	92½
Strip, CR	92½	70½	98½
Rod, bar	82½	65½	88½
Angles, HR	82½	65½	88½
Plate, HR	84½	66½	90½
Seamless Tube	115½	100½	137½
Shot, blocks		60	

Copper, Brass, Bronze

(Freight included on 500 lb)

	Sheet	Rods	Extruded Shapes
Copper	46.41		48.48
Copper, h-r	48.38	44.73	
Copper, drawn		45.98	
Low brass	44.47	44.41	
Yellow brass	41.72	41.66	
Red brass	45.44	45.38	
Naval brass	45.76	40.07	41.33
Leaded brass			39.11
Com. bronze	46.95	46.89	
Mang. bronze	49.48	43.62	45.18
Phos. bronze	66.58	67.08	
Muntz metal	43.96	39.77	41.02
Ni silver, 10 pct	55.36		62.63

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	21.50
Aluminum pig	20.00
Antimony, American, Laredo, Tex.	28.50
Beryllium copper, per lb cont'd Be	$40.00
Beryllium aluminum 5% Be, Dollars per lb contained Be	$72.75
Bismuth, ton lots	$2.25
Cadmium, del'd	$1.70
Cobalt, 97-99% (per lb)	$2.60 to $2.67
Copper, electro, Conn. Valley	29.75 to 30.00
Copper, Lake, delivered	30.00
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$165 to $175
Lead, St. Louis	13.30
Lead, New York	13.50
Magnesium 99.8+%, f.o.b. Freeport, Tex., 10,000 lb, pig	27.00
Ingot	27.75
Magnesium, sticks, 100 to 500 lb.	46.00 to 48.00
Mercury, dollars per 76-lb flask, f.o.b. New York	$205 to $210
Nickel electro, f.o.b. N. Y. warehouse	63.08
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	56.25
Palladium, dollars per troy oz.	$21.00
Platinum, dollars per troy oz.	$84 to $87
Silver, New York, cents per oz.	85.25
Tin, New York	95.50
Titanium, sponge	$5.00
Zinc, East St. Louis	10.25
Zinc, New York	10.75
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb delivered carloads)

85-5-5-5 ingot	
No. 115	23.50
No. 120	22.75
No. 123	22.25
80-10-10 ingot	
No. 305	27.75
No. 315	25.50
88-10-2 ingot	
No. 210	36.50
No. 215	33.00
No. 245	28.50
Yellow ingot	
No. 405	19.75
Manganese bronze	
No. 421	24.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	23.00-23.50
0.60 copper, max.	22.50-23.25
Piston alloys (No. 122 type)	20.50-21.50
No. 12 alum. (No. 2 grade)	19.50-20.50
108 alloy	20.00-21.00
195 alloy	21.50-22.00
13 alloy (0.60 copper max.)	23.00-23.50
ASX-679	20.00-21.00

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—96-97½%	20.75-21.50
Grade 2—92-95%	19.00-20.00
Grade 3—90-92%	18.00-19.00
Grade 4—85-90%	17.50-18.50

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 5000 lb lots)

Copper	
Cast, oval, 15 in. or longer	44.64
Electrodeposited	38.38
Flat rolled	47.14
Brass, 80-20	
Cast, oval, 15 in. or longer	43.515
Zinc, flat cast	20.25
Ball, anodes	18.50
Nickel, 99 pct plus	
Cast	84.00
Cadmium	$1.75
Silver 999 fine, rolled, 100 oz. lots per troy oz., f.o.b. Bridgeport, Conn.	94⅛

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63.90
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	30.00
Nickel chloride, 375 lb drum	38.00
Silver cyanide, 100 oz. lots, per oz.	75½
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	54.30

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	26	25¼
Yellow brass	19¾	18
Red brass	23	22¼
Comm. bronze	23⅛	22¼
Mang. bronze	18¼	17¼
Yellow brass rod ends	19½	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26 —26¼
No. 2 copper wire	24½—24¾
Light copper	23 —23¼
*Refinery brass	21¼—21½

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	26 —26¼
No. 2 copper wire	24½—24¾
Light copper	23 —23¼
No. 1 composition	18¾—19¼
No. 1 comp. turnings	18¼—18¾
Rolled brass	15¾—15¾
Brass pipe	16¼—16¾
Radiators	14¾—15½
Aluminum	
Mixed old cast	12 —12½
Mixed new clips	13½—14½
Mixed turnings, dry	12 —13
Pots and pans	12 —12½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass	
No. 1 heavy copper and wire	24
No. 2 heavy copper and wire	22½—22⅝
Light copper	20½—20⅝
New type shell cuttings	20½
Auto radiators (unsweated)	13¼—13⅝
No. 1 composition	17½
No. 1 composition turnings	16½—17
Unlined red car boxes	14⅝—15⅛
Cocks and faucets	14⅝—15⅛
Mixed heavy yellow brass	11½—12
Old rolled brass	14 —14½
Brass pipe	16 —16¼
New soft brass clippings	16⅜—17¼
Brass rod ends	14⅜—15¼
No. 1 brass rod turnings	12¼—12⅝
Aluminum	
Alum. pistons and struts	6 — 7
Aluminum crankcases	9½—10
2S aluminum clippings	12 —12½
Old sheet and utensils	9½—10
Borings and turnings	6 — 7
Misc. cast aluminum	9½—10
Dural clips (24S)	10 —10½
Zinc	
New zinc clippings	5½— 6
Old zinc	4 — 4½
Zinc routings	2½— 2¾
Old die cast scrap	2½— 3
Nickel and Monel	
Pure nickel clippings	60 —65
Clean nickel turnings	40
Nickel anodes	60 —65
Nickel rod ends	60 —65
New Monel clippings	22 —24
Clean Monel turnings	14 —15
Old sheet Monel	20 —22
Nickel silver clippings, mixed	13
Nickel silver turnings, mixed	11
Lead	
Soft scrap lead	10¼—10½
Battery plates (dry)	5½— 5⅝
Batteries, acid free	3¾— 4
Magnesium	
Segregated solids	20 —21
Castings	19 —20
Miscellaneous	
Block tin	65 —70
No. 1 pewter	45 —50
No. 1 auto babbitt	38 —40
Mixed common babbitt	12 —12½
Solder joints	14½—15
Siphon tops	35 —40
Small foundry type	15
Monotype	13½
Lino. and stereotype	12¾
Electrotype	11
Hand picked type shells	8
Lino. and stereo. dross	5
Electro dross	3½

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"Bristol-Fashion" means **Brass at its Best**

Chicago Leads "Flurry" in Midwest

A small bull in Chicago area is stiffening midwestern markets . . . St. Louis, Detroit feel broker pull . . . But Pittsburgh and eastern markets remain dull, quiet.

Markets are still generally weak, consumers' stocks are large, and buying is meager.

The exception is Chicago where a "small bull" is making itself felt as far away as Detroit and St. Louis.

For the second consecutive week prime steelmaking grades are stronger in the Chicago area. No. 1 heavy melting steel rose $1, and activity in factory bundles had brokers stretching to cover. Market in Chicago area is now firm, despite reports mills will reduce inventories.

For the second month in a row Chicago brokers walked off with prized Detroit automotive lists. Prices averaged perhaps $1 over last month's levels.

Pittsburgh market continues lethargic, with prices resting near the low for the year. Blast furnaces grades gained $2, but railroad specialties are all down one dollar.

Eastern markets are weak and dull and general feeling is that the market has just about hit bottom.

Pittsburgh—With exception of blast furnace grades, the market gave no real indication this week of anything but continued weakness. An independent mill was able to buy small tonnages at lower than quoted prices but tonnage involved was not enough to establish a market. On basis of a purchase, shoveling turnings are up $2 to a top of $18. Railroad specialties are down $1.

Chicago—Broker buying prices continued strong last week and were reinforced by mill sales that pegged dealer No. 1 heavy melting at $25. Factory bundles moved as high as $28, and brokers were stretching for this item in some instances. Prices hold strongly despite continuing reports that mills are seeking to reduce scrap inventories. Majority of purchasing agents feel they will be paying more for their scrap (including electric furnace for foundry use) within another week. No. 2 dealer bundles continue poor.

Philadelphia — This market continues to mope along with little change. Several price spreads are narrowed this week but it reflects adjustment more than change. Cast grades continue strong by comparison and two prices edged slightly higher in foundry material.

New York—Absolutely no change is reported here with the trade nearly unanimous in feeling this is the bottom—the only way things can move now is upward. Higher prices in some midwestern markets have bolstered dealer resistance to low prices and the tendency to hold on to material is increasing.

Detroit—For the second straight month Chicago brokers walked off with Detroit automotive scrap lists at prices that averaged perhaps $1 over last month's levels. The trade here has observed instances of strength in other districts with envy, since it has not touched the dealer level yet. Probably not a single dealer here has an order for No. 1 bundles and all local mills indicate they are out of the market through April. In spite of the outside invasion, no development here has justified a price increase for any grade.

Cleveland—Industrial and railroad lists have been delivered at $28 in the Valley. Dealers, however, hesitate to predict any general increase in prices. Most scrap men feel dealer material has hit bottom. Mills still aren't ordering and inventories continue to bulge. Valley turnings prices have not changed recently but there is a definite undertone of strength in blast furnace grades.

Birmingham — Brokers report they are having some difficulty in filling orders for scrap. Orders received Mar. 1 are still being filled. Reason for this, they say, is that the low prices offered by mills do not make it profitable for suppliers to bring the scrap into dealers' yards and most dealers are able to supply only one or two carloads on an order. Mill buying, however, is slow. Cast market is reported dull by most scrap sources.

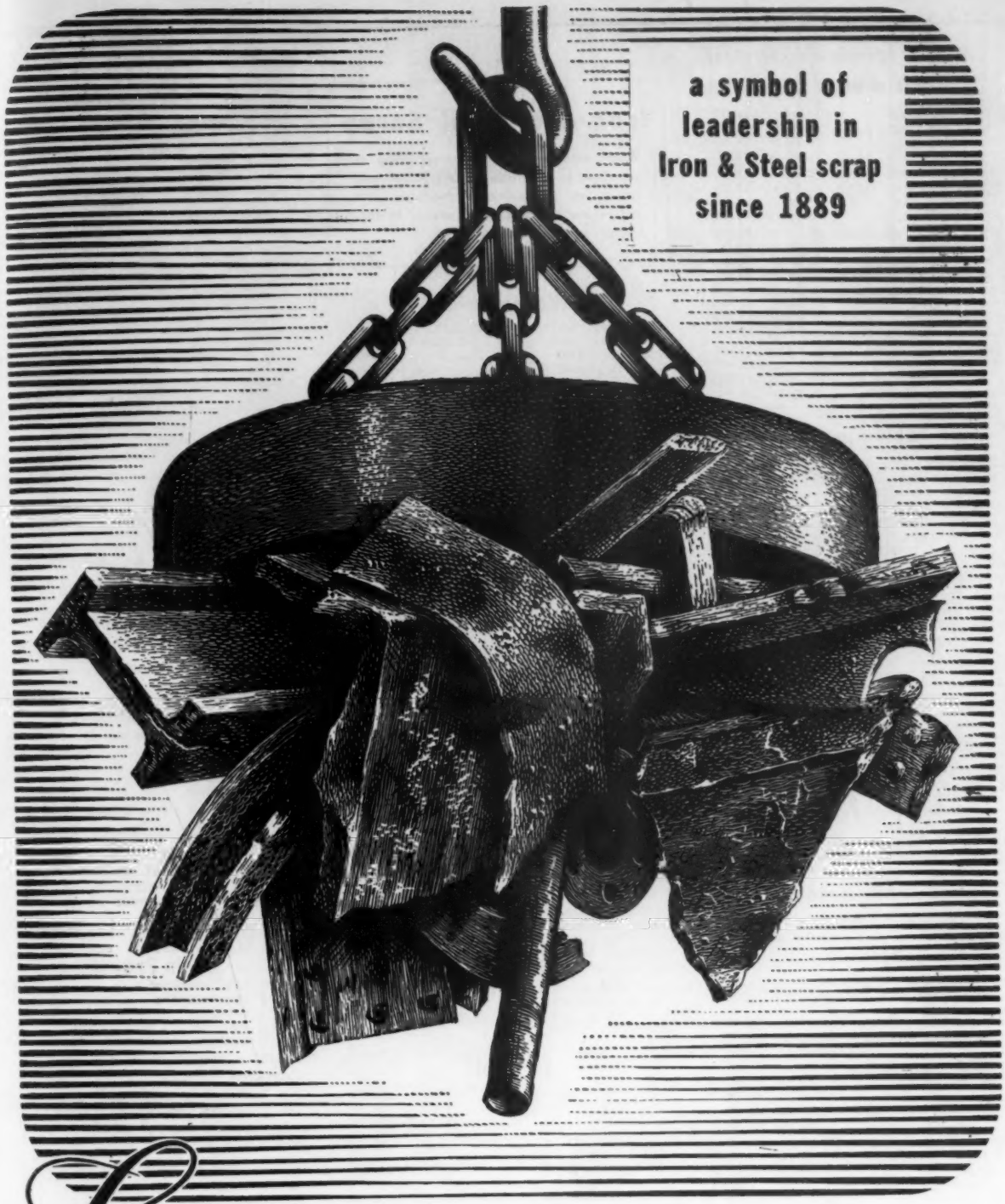
St. Louis — Scrap market here is stronger and prices for openhearth grades are higher as a result of increased buying prices by outside mills which must be met here. Only offerings of regular sources are being taken by local mills. A little buying is expected sometime in April.

Cincinnati—Low phos went up $1 to $31 on the basis of a sale. Otherwise dealers and brokers were sitting tight hoping for at least a $1 across-the-board increase when April buying prices came out. Brokers here are watching bullish developments in the Midwest with fingers crossed hoping it won't take too long before the market firms in the Cincinnati area.

Buffalo — Better sentiment prevails as cast prices advance another $1. Active buying of cast continues from both local and Canadian consumers. Although interest in steel and blast furnace items is limited, a better feeling was apparent among dealers. Possibility of government-supported stockpiling was a major factor, though this hope was growing dimmer as it became more apparent the government won't take part.

Boston — Prices remain unchanged in this becalmed market. Members of the trade report that higher prices in other districts have not made any impact in New England. Demand for chemical borings has slipped a bit and this dropped $2 from the price. Very limited tonnages of mixed cast scrap are moving.

West Coast—No major change is reported in the sluggish market for steelmaking grades but there has been a modest increase in buying in the Los Angeles area. Cast market this week has strengthened in northern California and Washington.



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IMPORT & EXPORT DIV. LIVINGSTON & SOUTHARD, INC. 50 Broadway, New York, N. Y. *Cable Address:* FORENTRACO

Scrap Prices

(Effective Mar. 30, 1954)

Pittsburgh

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles	25.00 to 26.00
No. 2 bundles	21.00 to 22.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and ms. turns.	13.00 to 14.00
Shoveling turnings	17.00 to 18.00
Cast iron borings	15.00 to 16.00
Low phos. punch'gs, plate	28.00 to 29.00
Heavy turnings	23.00 to 24.00
No. 1 RR. hvy. melting	28.00 to 29.00
Scrap rails, random lgth.	47.00 to 48.00
Rails 2 ft and under	43.00 to 44.00
RR. steel wheels	32.00 to 33.00
RR. spring steel	32.00 to 33.00
RR. couplers and knuckles	32.00 to 33.00
No. 1 machinery cast.	41.00 to 42.00
Cupola cast.	35.00 to 36.00
Heavy breakable cast.	30.00 to 31.00
Malleable	28.00 to 29.00

Chicago

No. 1 hvy. melting	$25.00 to $27.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 factory bundles	27.00 to 28.00
No. 1 dealers' bundles	26.00 to 27.00
No. 2 dealers' bundles	17.00 to 19.00
Machine shop turn.	9.50 to 10.50
Mixed bor. and turn.	9.50 to 10.50
Shoveling turnings	11.50 to 12.50
Cast iron borings	11.50 to 12.50
Low phos. forge crops	33.00 to 34.00
Low phos. punch'gs, plate	29.00 to 31.00
Low phos. 3 ft and under	28.00 to 29.00
No. 1 RR. hvy. melting	28.00 to 30.50
Scrap rails, random lgth.	30.00 to 31.00
Rerolling rails	35.00 to 36.00
Rails 2 ft and under	39.00 to 40.00
Locomotive tires, cut	31.00 to 33.00
Cut bolsters & side frames	32.00 to 34.00
Angles and splice bars	34.00 to 35.00
RR. steel car axles	36.00 to 38.00
RR. couplers and knuckles	32.00 to 33.00
No. 1 machinery cast.	36.00 to 38.00
Cupola cast.	33.00 to 34.00
Heavy breakable cast.	27.00 to 28.00
Cast iron brake shoes	33.00 to 35.00
Cast iron car wheels	32.00 to 33.00
Malleable	38.00 to 39.00
Stove plate	27.00 to 28.00

Philadelphia Area

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	19.00 to 20.00
No. 1 bundles	21.00 to 22.00
No. 2 bundles	17.00 to 18.00
Machine shop turn.	10.00 to 11.00
Mixed bor. short turn.	10.00 to 11.00
Cast iron borings	10.00 to 11.00
Shoveling turnings	15.00 to 16.00
Clean cast chem. borings	24.00 to 25.00
Low phos. 5 ft and under	24.00 to 26.00
Low phos. 2 ft and under	25.00 to 27.00
Low phos. punch'gs	25.00 to 27.00
Elec. furnace bundles	23.00 to 24.00
Heavy turnings	20.00 to 21.00
RR. steel wheels	29.00 to 30.00
RR. spring steel	29.00 to 30.00
Rails 18 in. and under	39.00 to 40.00
Cupola cast.	34.00 to 35.00
Heavy breakable cast.	36.00 to 37.00
Cast iron carwheels	38.00 to 39.00
Malleable	38.00 to 39.00
Unstripped motor blocks	27.00 to 28.00
No. 1 machinery cast.	38.00 to 39.00
Charging box cast.	36.00 to 37.00

Cleveland

No. 1 hvy. melting	$21.00 to $22.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 bundles	21.00 to 22.00
No. 2 bundles	15.00 to 16.00
No. 1 busheling	20.00 to 21.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	13.00 to 14.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Cut struct'r'l plate, 2 ft & under	30.00 to 31.00
Drop forge flashings	21.00 to 22.00
No. 1 RR. heavy melting	26.00 to 27.00
Rails 3 ft and under	43.00 to 44.00
Rails 18 in. and under	44.00 to 45.00
Railroad grate bars	27.00 to 28.00
Steel axle turnings	19.00 to 20.00
Railroad cast.	39.00 to 40.00
No. 1 machinery cast.	40.00 to 41.00
Stove plate	33.00 to 34.00
Malleable	39.00 to 40.00

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Youngstown

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	20.00 to 21.00
No. 1 bundles	25.00 to 26.00
No. 2 bundles	18.00 to 19.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	13.00 to 14.00
Cast iron borings	13.00 to 14.00
Low phos. plate	27.00 to 28.00

Buffalo

No. 1 hvy. melting	$22.00 to $23.00
No. 2 hvy. melting	18.50 to 19.50
No. 1 busheling	22.00 to 23.00
No. 1 bundles	22.00 to 23.00
No. 2 bundles	16.50 to 17.50
Machine shop turn.	11.50 to 12.50
Mixed bor. and turn.	13.50 to 14.50
Shoveling turnings	15.50 to 16.50
Cast iron borings	13.50 to 14.50
Low phos. plate	27.00 to 28.00
Scrap rails, random, lgth.	32.00 to 33.00
Rails 2 ft and under	39.00 to 40.00
RR. steel wheels	34.00 to 35.00
RR. spring steel	34.00 to 35.00
RR. couplers and knuckles	34.00 to 35.00
No. 1 machinery cast.	38.00 to 39.00
No. 1 cupola cast.	34.00 to 35.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$15.00 to $16.00
No. 2 hvy. melting	14.00 to 15.00
No. 1 bundles, openhearth	16.00 to 17.00
No. 2 bundles	14.00 to 15.00
New busheling	15.00 to 16.00
Drop forge flashings	15.00 to 16.00
Machine shop turn.	4.50 to 5.50
Mixed bor. and turn.	6.50 to 7.50
Shoveling turnings	6.50 to 7.50
Cast iron borings	6.50 to 7.50
Low phos. punch's, plate	16.00 to 17.00
No. 1 cupola cast.	35.00
Heavy breakable cast.	24.00
Stove plate	28.00
Automotive cast.	35.00

St. Louis

No. 1 hvy. melting	$25.00 to $26.00
No. 2 hvy. melting	23.00 to 24.00
No. 1 bundles	25.00 to 26.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	10.00 to 11.00
Cast iron borings	12.00 to 13.00
Shoveling turnings	12.00 to 13.00
No 1 RR. hvy. melting	29.00 to 30.00
Rails, random lengths	34.00 to 35.00
Rails, 18 in. and under	37.00 to 39.00
Locomotive tires, uncut	29.00 to 30.00
Angles and splice bars	31.00 to 32.00
Std. steel car axles	35.00 to 36.00
RR. spring steel	31.50 to 32.50
Cupola cast.	38.00 to 39.00
Hvy. breakable cast.	23.00 to 24.00
Cast iron brake shoes	30.00 to 31.00
Stove plate	31.00 to 32.00
Cast iron car wheels	30.00 to 31.00
Malleable	34.00 to 35.00
Unstripped motor blocks	23.00 to 24.00

New York

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$13.00 to $14.00
No. 2 hvy. melting	11.00 to 12.00
No. 2 bundles	9.00 to 10.00
Machine shop turn.	4.00 to 5.00
Mixed bor. and turn.	6.00 to 7.00
Shoveling turnings	7.00 to 8.00
Clean cast chem. borings	18.00 to 19.00
No. 1 machinery cast.	35.00 to 36.00
Mixed yard cast.	29.00 to 30.00
Charging box cast.	29.00 to 30.00
Heavy breakable cast.	29.00 to 30.00
Unstripped motor blocks	22.00 to 23.00

Birmingham

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	18.00
No. 1 bundles	20.00
No. 2 bundles	$15.00 to 16.00
No. 1 busheling	20.00
Machine shop turn.	13.00
Shoveling turnings	15.00
Cast iron borings	13.00 to 14.00
Electric furnace bundles	25.00 to 26.00
Bar crops and plate	28.00 to 29.00
Structural and plate, 2 ft.	28.00 to 29.00
No. 1 RR. hvy. melting	23.00 to 24.00
Scrap rails, random lgth.	32.00 to 34.00
Rails, 18 in. and under	37.00 to 38.00
Angles & splice bars	35.00 to 36.00
Rerolling rails	32.00 to 33.00
No. 1 cupola cast.	40.00 to 41.00
Stove plate	37.00 to 38.00
Cast iron car wheels	33.00 to 34.00
Charging box cast.	23.00 to 24.00
Heavy breakable	24.00 to 25.00
Unstripped motor blocks	31.00 to 32.00
Mashed tin cans	14.00 to 15.00

Boston

Brokers' buying prices per gross ton, on cars:

No. 1 hvy. melting	$13.00 to $16.00
No. 2 hvy. melting	9.00 to 11.00
No. 1 bundles	12.00 to 14.00
No. 2 bundles	7.00 to 9.00
No. 1 busheling	11.00 to 12.00
Elec. furnace, 3 ft & under	13.00 to 16.00
Machine shop turn.	1.00 to 1.50
Mixed bor. and short turn.	6.00 to 7.00
Shoveling turnings	7.00 to 7.25
Clean cast chem. borings	11.00 to 12.00
No. 1 machinery cast.	27.00 to 28.00
Mixed cupola cast.	23.00 to 24.00
Heavy breakable cast.	25.50 to 26.00
Stove plate	20.00 to 21.00
Unstripped motor blocks	7.00 to 8.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$22.00 to $23.00
No. 2 hvy. melting	18.00 to 19.00
No. 1 bundles	22.00 to 23.00
No. 2 bundles	16.00 to 17.00
Machine shop turn.	9.00 to 10.00
Mixed bor. and turn.	10.00 to 11.00
Shoveling turnings	12.00 to 13.00
Cast iron borings	10.00 to 11.00
Low phos., 18 in. & under	30.00 to 31.00
Rails, random lengths	34.00 to 35.00
Rails, 18 in. and under	42.00 to 43.00
No. 1 cupola cast.	34.00 to 35.00
Hvy. breakable cast.	29.00 to 30.00
Drop broken cast.	40.00 to 41.00

San Francisco

No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Cast iron borings	9.00
No. 1 RR. hvy. melting	23.00
No. 1 cupola cast.	$39.00 to 40.00

Los Angeles

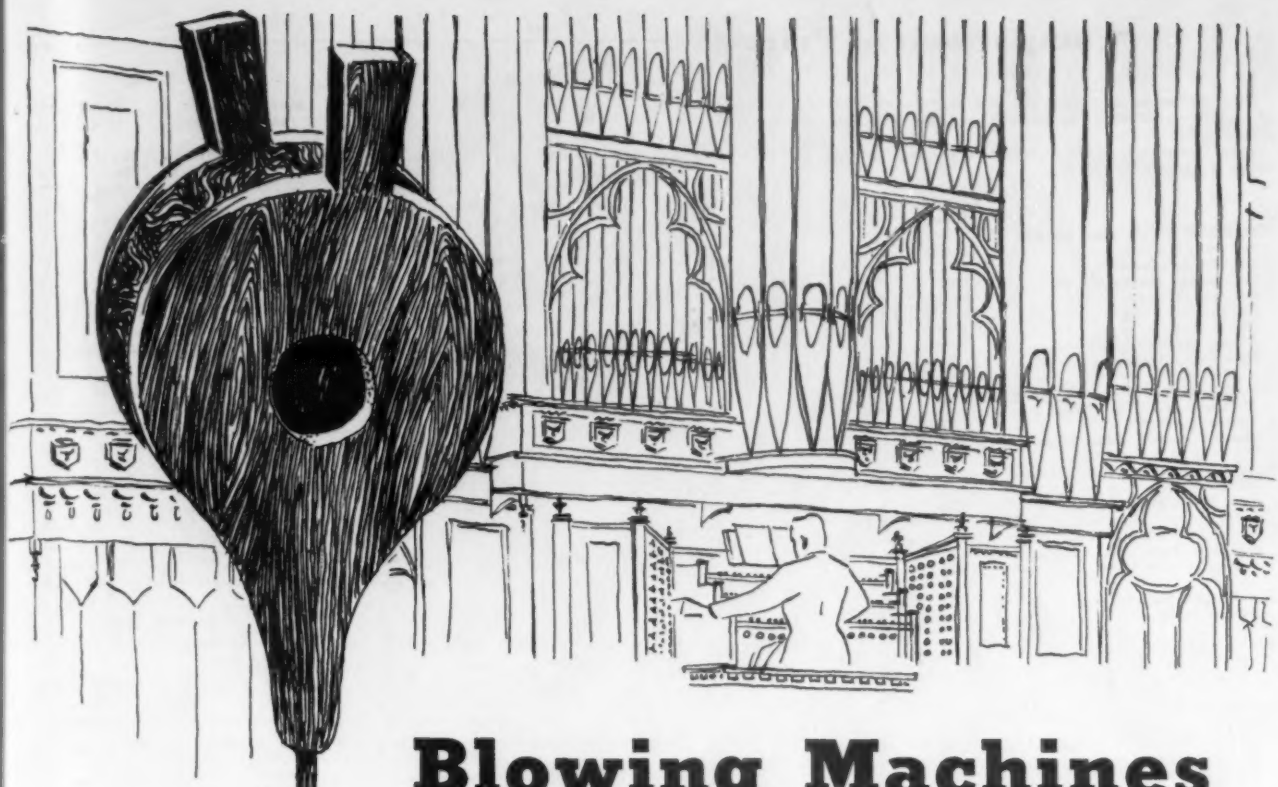
No. 1 hvy. melting	$20.00
No. 2 hvy. melting	16.00
No. 1 bundles	19.00
No. 2 bundles	16.00
No. 3 bundles	12.00
Machine shop turn.	5.00
Shoveling turnings	$7.00 to 9.00
Cast iron borings	7.00 to 9.00
Elec. fur. 1 ft and under.	25.00
No. 1 RR. hvy. melting	20.00
No. 1 cupola cast.	37.00 to 38.00

Seattle

No. 1 hvy. melting	$23.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	16.00
No. 3 bundles	12.00
No. 1 cupola cast.	37.00
Mixed yard cast.	35.00

Hamilton, Ont.

No. 1 hvy. melting	$22.00
No. 2 hvy. melting	19.00
No. 1 bundles	22.00
No. 2 bundles	19.00
Mixed steel scrap	16.00
Bushelings	17.00
Bush., new fact prep'd.	20.00
Bush., new fact unprep'd.	16.00
Short steel turnings	12.00
Mixed bor. and turn.	12.00
Rails, remelting	31.00
Cast scrap	$42.00 to 45.00



Blowing Machines

One of the oldest, simplest and most common of blowing machines is the bellows, used by workers in metals since time immemorial. But about 1550, one Hans Lobsinger, an organist at Nuremberg, invented a wooden bellows for use in blast furnaces.

Today, bellows of wood have given way to "blowing machines" of steel, and to purposes not confined to the church, the forge, or even the blast furnace. Their uses have been multiplied for innumerable tasks on the farm, in the home, for industry, transportation, and the military.

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Comparison of Prices

(Effective Mar. 30, 1954)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Mar. 30 1954	Mar. 23 1954	Mar. 2 1954	Mar. 31 1953
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.925¢	3.925¢	3.925¢	3.775¢
Cold-rolled sheets	4.775	4.775	4.775	4.575
Galvanized sheets (10 ga.)	5.275	5.275	5.275	5.075
Hot-rolled strip	3.925	3.925	3.925	3.725
Cold-rolled strip	5.513	5.513	5.513	5.20
Plate	4.10	4.10	4.10	3.90
Plates wrought iron	9.30	9.30	9.30	9.00
Stainl'a C-R strip (No. 302)	41.50	41.50	41.50	38.48
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.95
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.65
Special coated mfg. terns	7.75	7.75	7.75	7.75
Bars and Shapes: (per pound)				
Merchant bars	4.16¢	4.16¢	4.16¢	3.95¢
Cold finished bars	5.20	5.20	5.20	4.925
Alloy bars	4.875	4.875	4.875	4.675
Structural shapes	4.10	4.10	4.10	3.85
Stainless bars (No. 302)	35.50	35.50	35.50	32.98
Wrought iron bars	10.40	10.40	10.40	10.05
Wire: (per pound)				
Bright wire	5.525¢	5.525¢	5.525¢	5.225¢
Rails: (per 100 lb.)				
Heavy rails	$4.325	$4.325	$4.325	$3.775
Light rails	5.20	5.20	5.20	4.25
Semifinished Steel: (per net ton)				
Rerolling billets	$62.00	$62.00	$62.00	$59.00
Slabs, rerolling	62.00	62.00	62.00	59.00
Forging billets	75.50	75.50	75.50	70.50
Alloy blooms, billets, slabs	82.00	82.00	82.00	76.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.525¢	4.525¢	4.525¢	4.325¢
Skelp	3.75	3.75	3.75	3.55
Finished Steel Composite: (per pound)				
Base price	4.634¢	4.634¢	4.634¢	4.376¢

	Mar. 30 1954	Mar. 23 1954	Mar. 3 1954	Mar. 31 1953
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$61.19	$61.19	$61.19	$60.69
Foundry, Valley	56.50	56.50	56.50	56.00
Foundry, Southern, Cin'ti	60.43	60.43	60.43	59.93
Foundry, Birmingham	52.88	52.88	52.88	51.38
Foundry, Chicago	56.50	56.50	56.50	55.00
Basic del'd, Philadelphia	60.27	60.27	60.27	59.77
Basic, Valley furnace	56.00	56.00	56.00	54.50
Malleable, Chicago	56.50	56.50	56.50	55.00
Malleable, Valley	56.50	56.50	56.50	56.00
Ferromanganese‡, cents per lb.	10.00¢	10.00¢	10.00¢	8.94¢
‡ 76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$56.59	$56.59	$56.59	$55.24
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$25.50	$25.50	$24.50	$44.75
No. 1 steel, Phila. area	*21.50*	22.00	22.50	44.50
No. 1 steel, Chicago	26.00	25.00	24.50	43.50
No. 1 bundles, Detroit	16.50	16.50	17.50	40.50
Low phos., Youngstown	27.50	27.50	26.50	49.50
No. 1 mach'y cast, Pittsburgh	41.50	41.50	41.50	52.50
No. 1 mach'y cast, Philadel'a	38.50	38.50	39.00	49.00
No. 1 mach'y cast, Chicago	37.00	36.50	34.00	46.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$24.33	$24.17	$23.83	$44.25
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.38	$14.38	$14.38	$14.75
Foundry coke, prompt	17.25	17.25	17.25	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	29.875‡	29.875‡	29.75‡	31.00‡
Copper, Lake, Conn.	30.00	30.00	30.00	32.125
Tin, Straits, New York	95.50†	95.00	86.75	91.20
Zinc, East St. Louis	10.25	9.75	9.25	11.00
Lead, St. Louis	13.30	12.80	12.30	13.50
Aluminum, virgin ingot	21.50	21.50	21.50	20.50
Nickel, electrolytic	63.08	63.08	63.08	63.08
Magnesium, ingot	27.75	27.75	27.75	27.00
Antimony, Laredo, Tex.	28.50	28.50	28.50	34.50

† Tentative. ‡ Average. * Revised.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

← To identify producers, see Key on p. 181 →

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	58.00	58.50	59.00	59.50	.....
Birmingham *R3*	52.38	52.88	.....	.....	.....
Birmingham *W9*	52.38	52.88	.....	.....	.....
Birmingham *S5*	52.38	52.88	.....	.....	.....
Buffalo *R3*	56.00	56.50	57.00	.....	.....
Buffalo *H1*	56.00	56.50	57.00	.....	.....
Buffalo *W6*	56.00	56.50	57.00	.....	.....
Chicago *I4*	56.00	56.50	56.50	57.00	.....
Cleveland *A5*	56.00	56.50	56.50	57.00	61.00
Cleveland *R3*	56.00	56.50	56.50	.....	.....
Daingerfield *L3*	52.50	52.50	52.50	.....	.....
Duluth *I4*	56.00	56.50	56.50	57.00	.....
Erie *I4*	56.00	56.50	56.50	57.00	.....
Everett *M6*	.....	61.25	61.75	.....	.....
Fontana *K1*	62.00	62.50	.....	.....	.....
Geneva, Utah *C7*	56.00	56.50	.....	.....	.....
Granite City *G2*	57.90	58.40	58.90	.....	.....
Hubbard *Y1*	.....	.....	56.50	.....	.....
Minnequa *C6*	58.00	59.00	59.00	.....	.....
Monessen *P6*	56.00	.....	.....	.....	.....
Neville Isl. *P4*	56.00	56.50	56.50	.....	.....
Pittsburgh *U1*	56.00	.....	.....	57.00	.....
Sharpsville *S3*	56.00	56.50	56.50	57.00	.....
Steelton *B3*	58.00	58.50	59.00	59.50	64.00
Swedeland *A2*	58.00	58.50	59.00	59.50	.....
Toledo *I4*	56.00	56.50	56.50	57.00	.....
Troy, N. Y. *R3*	58.00	58.50	59.00	59.50	64.00
Youngstown *Y1*	.....	.....	56.50	57.00	.....
N. Tonawanda *T1*	.....	56.50	57.00	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct., $2 per ton for .05 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 and over.

Silvery Iron: Buffalo, *H1*, $68.25; Jackson, *J1*, *G1* $67.00. Add $1.50 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add $1 per ton for 0.75 pct. or more phosphorus. Add 75¢ for each 0.50 pct. manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb., f.o.b. mill

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	16.25	17.25	18.75	18.25	28.00	22.75	24.50	14.00	.....	14.25
Slabs, billets, rerolling	20.50–20.75	22.75	24.75	23.75	36.25	29.50	32.25	18.25	.....	18.50
Forg. discs, die blocks, rings	38.50	38.50	41.50	40.50	60.00	45.50	50.75	31.00	31.75	31.75
Billets, forging	29.50	29.75	32.25	31.00	46.50–46.75	35.25	39.50	24.00	24.50	24.50
Bars, wires, structurals	35.25	35.50	38.25	37.25	55.50	42.00	46.75	28.75	29.25	29.25
Plates	37.25	37.50	39.75	39.75	58.75–59.00	45.75–46.00	51.25	30.00	30.50–31.00	30.50
Sheets	46.25	46.50	48.75	48.75	64.50	55.50	60.75	40.75	41.25	43.50
Strip, hot-rolled	29.75	32.00	36.75	34.25	55.00	42.00	46.50	26.25	.....	27.00
Strip, cold-rolled	38.25	41.50	45.50	43.75	66.50	54.50	59.25	34.25	41.25	34.75

STAINLESS STEEL PRODUCING POINTS

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Lockport, N. Y., *R4*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Lockport, N. Y., *S4*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher) *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bars: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa. *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y. *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Lockport, N. Y., *S4*; Canton, O., *T5*; Ft. Wayne, *I4*.

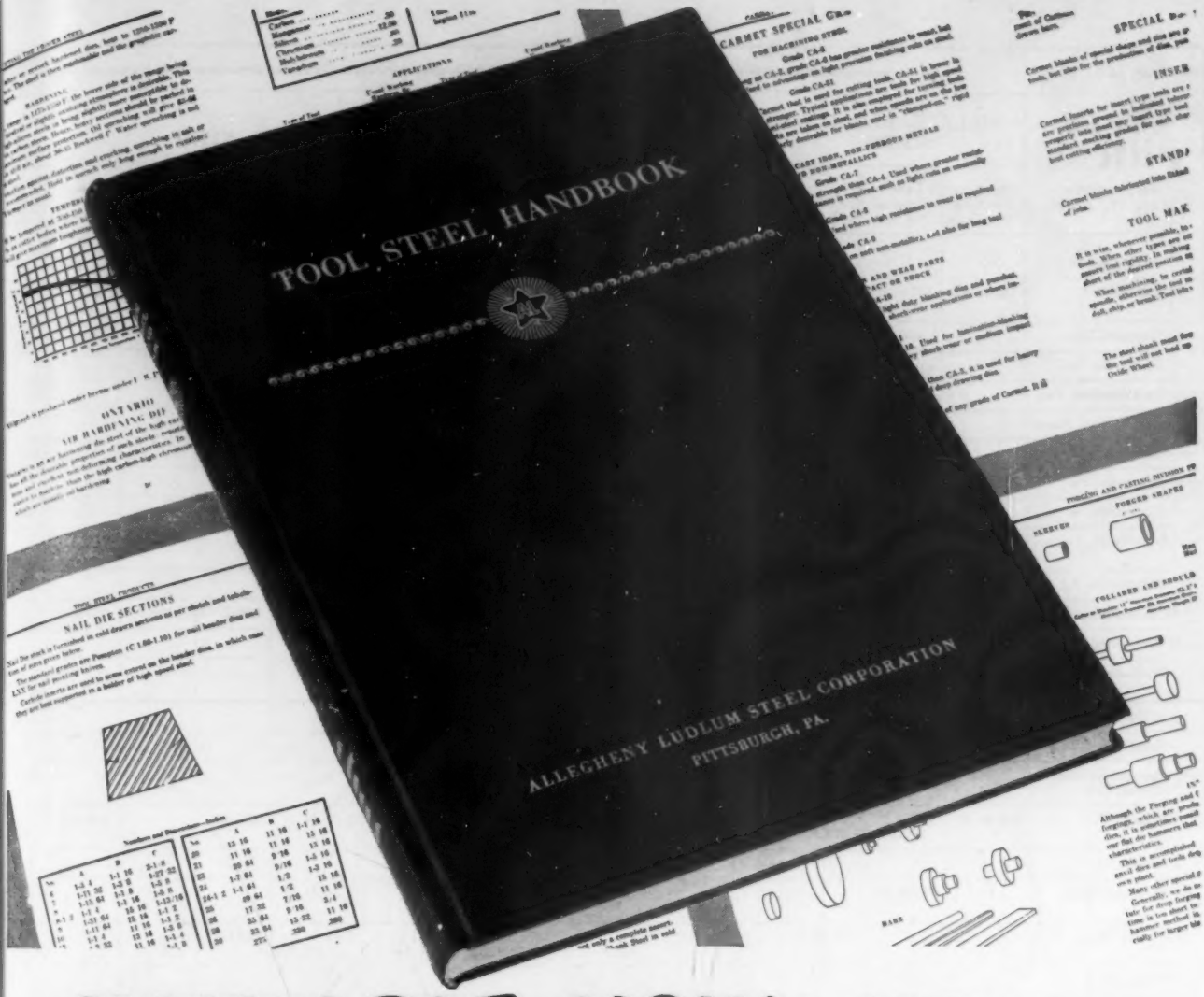
Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Lockport, N. Y., *S4*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forging billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3*; Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*.



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AL FINE TOOL STEELS SINCE 1854

STEEL PRICES

(Effective Mar. 30, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PILING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$82.00 *B3*		4.15 *B3*	6.20 *B3*	4.15 *B3*						
	Buffalo, N. Y.	$62.00 *B3*	$75.50 *B3, R3*	$82.00 *B3, R3*	4.925 *B3*	4.15 *B3*	6.20 *B3*	4.15 *B3*	3.925 *B3, R3*	5.45 *B3*	6.00 *B3*	8.425 *B3*		
	Claymont, Del.													
	Conshohocken, Pa.								4.05 *A2*		5.90 *A2*			
	Coatesville, Pa.													
	New Bedford, Mass.									6.00 *R6*				
	Harrison, N. J.													12.80 *C11*
	Johnstown, Pa.	$62.00 *B3*	$75.50 *B3*	$82.00 *B3*		4.15 *B3*	6.20 *B3*							
	Morrisville, Pa.													
	New Haven, Conn.									5.90 *D1* 6.20 *A5*				
	Phoenixville, Pa.					4.15 *P2*		4.95 *P2*						
	Sparrows Pt., Md.								3.925 *B3*	5.45 *B3*	6.00 *B3*	8.425 *B3*		
	Wallingford, Conn.									5.90 *W1*				
	Worcester, Mass.									6.30 *A5*				12.30 *A5* 12.45 *N7*
MIDDLE WEST	Alton, Ill.								4.10 *L1*					
	Ashland, Ky.								3.925 *A7*					
	Canton-Massillon, Dover, Ohio			$82.00 *R3, T5*										12.80 *G4*
	Chicago, Ill.	$62.00 *U1*	$75.50 *R3, U1, W8*	$82.00 *U1, W8, R3*	4.925 *U1*	4.10 *U1, W8*	6.175 *U1, Y1*	4.10 *U1*	3.925 *A1, W8*	5.70 *A1*	5.95 *R3*		6.40 *W8*	
	Sterling, Ill.													
	Cleveland, Ohio		$75.50 *R3*							5.45 *A5, J3*		7.80 *J3* 8.15 *A5*		12.00 *A5* 12.15 *N7*
	Detroit, Mich.			$84.00 *R5*					4.125 *G3* 4.15 *M2*	5.65 *D1, D2, G3, M2, P11*	6.15 *G3*	7.90 *D2* 8.35 *G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$62.00 *U1*	$75.50 *U1*	$82.00 *U1, Y1*	4.925 *I3*	4.10 *I3, U1*	6.175 *U1, I3*		3.925 *I3, U1, Y1*	5.70 *I3*	5.95 *U1, I3* 6.45 *Y1*		6.40 *U1*	
	Granite City, Ill.													
	Indianapolis, Ind.									5.60 *C5*				
	Mansfield, Ohio													
	Middletown, Ohio									5.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.								3.925 *S1*	5.45 *S1, T4*	5.95 *S1*	7.65 *S1*	6.40 *S1*	12.00 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	$62.00 *U1, J3*	$75.50 *J3, U1*	$82.00 *U1, C11*	4.925 *U1*	4.10 *J3, U1*	6.175 *J3, U1*	4.10 *U1*	3.925 *A7, P6* 3.95 *S7* 4.425 *S9*	5.45 *B4, J3, S7*		7.80 *J3*	6.40 *S9* 6.45 *S7*	12.00 *S9* 12.15 *S7*
	Portsmouth, Ohio								3.925 *P7*					
	Weirton, Wheeling, Follansbee, W. Va.					4.10 *W3*			3.925 *W3*	5.45 *F3, W3*	5.95 *W3*	8.15 *W3*		
	Youngstown, Ohio			$82.00 *Y1, C10*		4.10 *Y1*	6.675 *Y1*		3.925 *R3, U1, Y1*	5.45 *R3, Y1, C5*	5.95 *U1, R3* 6.45 *Y1*	7.60 *R3* 8.30 *Y1*	6.40 *U1*	12.00 *C5*
WEST	Fontana, Cal.	$70.00 *K1*	$83.50 *K1*	$101.00 *K1*		4.75 *K1*	6.825 *K1*	5.10 *K1*	4.70 *K1*	7.35 *K1*	7.05 *K1*		7.80 *K1*	13.65 *K1*
	Geneva, Utah		$75.50 *C7*			4.10 *C7*	6.175 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.775 *S2*		4.525 *S2*		6.55 *S2*		7.00 *S2*	
	Los Angeles, Torrance, Cal.		$85.00 *B2*	$102.00 *B2*		4.80 *B2, C7*	6.85 *B2*		4.675 *B2, C7*	7.50 *C1*			7.60 *B2*	
	Minnequa, Colo.					4.55 *C6*			5.025 *C6*					
	San Francisco, Niles, Pittsburg, Cal.		$85.00 *B2*			4.75 *B2* 4.91 *P9*	6.80 *B2*		4.675 *B2, C7*					
	Seattle, Wash.		$89.00 *B2, S11*			4.85 *B2*	6.90 *B2*							
SOUTH	Atlanta, Ga.								4.125 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$62.00 *T2*	$75.50 *T2*			4.10 *R3, T2*	6.175 *T2*		3.925 *R3, T2, C16*		5.95 *T2*			
	Houston, Tex.		$83.50 *S2*	$90.00 *S2*		4.50 *S2*			4.425 *S2*				6.80 *S2*	

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES

(Effective Mar. 30, 1954)

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Coke* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.	
													Bethlehem, Pa.
3.925 *B3*	4.775 *B3*				5.90 *B3*	7.225 *B3*			4.525 *W6*				Buffalo, N. Y.
										† Special coated mfg. terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb add 25¢. ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢.			Claymont, Del.
													Coatesville, Pa.
4.05 *A2*					5.90 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.525 *B3*				Johnstown, Pa.
4.025 *U1*	4.875 *U1*									$8.80 *U1*	$7.50 *U1*		Morrisville, Pa.
													New Haven, Conn.
													Phoenixville, Pa.
3.925 *B3*	4.775 *B3*	5.275 *B3*			5.90 *B3*	7.225 *B3*	8.075 *B3*		4.625 *B3*	$8.80 *B3*	$7.50 *B3*		Sparrows Pt., Md.
									4.825 *A5*				Worcester, Mass.
													Trenton, N. J.
									4.70 *L1*				Alton, Ill.
3.925 *A7*		5.275 *A7*	5.175 *A7*										Ashland, Ky.
		5.275 *R1, R3*						5.05 *R1*					Canton-Massillon, Dover, Ohio
3.925 *A1, W8*					5.90 *U1*				4.525 *A5, N4, R3*				Chicago, Joliet, Ill.
									4.625 *N4*				Sterling, Ill.
3.925 *J3, R3*	4.775 *J3, R3*		5.175 *R3*		5.90 *J3, R3*	7.225 *J3, R3*			4.525 *A5*				Cleveland, Ohio
4.125 *G3* 4.15 *M2*	4.975 *G3*				6.10 *G3*	7.425 *G3*							Detroit, Mich.
3.925 *N5*													Newport, Ky.
3.925 *I3, U1, Y1*	4.775 *I3, U1, Y1*	5.275 *U1, I3*	5.175 *I3, U1*	5.675 *U1*	5.90 *U1, I3* 6.40 *Y1*	7.225 *U1* 7.725 *Y1*				$8.70 *I3, U1, Y1*	$7.40 *I3, U1*	6.10 *U1, Y1*	Gary, Ind. Harbor, Indiana
4.125 *G2*	4.975 *G2*	5.475 *G2*	5.875 *G2*								$7.60 *G2*	6.30 *G2*	Granite City, Ill.
4.025 *C9*		5.375 *C9*						5.025 *C9*					Kokomo, Ind.
				5.675 *E2*				5.05 *E2*					Mansfield, Ohio
	4.775 *A7*		5.175 *A7*	5.675 *A7*									Middletown, Ohio
3.925 *S1* 5.175 *N3*	5.80 *N3*	5.275 *N3*	6.525 *N3*	5.45 *S1* 5.675 *N3*	5.90 *S1*						$7.40 *R3*		Niles, Ohio Sharon, Pa.
3.925 *J3, U1, P6, A7*	4.775 *J3, U1, P6*	5.275 *U1*	5.175 *U1*		5.90 *J3, U1*	7.22 *J3, U1*	7.925 *U1*		4.525 *A5* 4.725 *P6*	$8.70 *J3, U1*	$7.40 *J3, U1*	6.10 *U1*	Pittsburgh, Pa. Midland, Pa. Butler, Pa.
3.925 *P7*	4.775 *P7*								4.525 *P7*				Portsmouth, Ohio
3.925 *W3, W5*	4.775 *W3, W5, F3*	5.275 *W3, W5*		5.675 *W3, W5*	5.90 *W3*	7.225 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.10 *F3, W5*	Weirton, Wheeling, Follansbee, W. Va.
3.925 *R3, U1, Y1*	4.775 *R3, Y1*		5.175 *Y1*		5.90 *U1, R3* 6.40 *Y1*	7.225 *R3* 7.725 *Y1*			4.525 *Y1*	$8.70 *R3*			Youngstown, Ohio
4.70 *K1*	5.875 *K1*				6.675 *K1*	8.275 *K1*			5.325 *K1*				Fontana, Cal.
4.025 *C7*													Geneva, Utah
								4.775 *C6*	4.865 *S2*				Kansas City, Mo.
4.625 *C7*		6.275 *C7*							5.325 *B2*				Los Angeles, Torrance, Cal.
									4.775 *C6*				Minnequa, Colo.
4.625 *C7*	5.725 *C7*	6.025 *C7*							5.175 *C7*	$9.45 *C7*	$8.15 *C7*		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.925 *R3, T2*	4.775 *T2*	5.275 *R3, T2*			5.90 *T2*			5.125 *T2* 5.225 *R3*	4.525 *T2 R3*	$8.80 *T2*	$7.50 *T2*		Fairfield, Ala. Alabama City, Ala.
4.325 *S2*									4.925 *S2*				Houston, Texas

IRON AGE

STEEL PRICES

(Effective Mar. 30, 1954)

Italics identify producers listed in key at end of table. Base prices, f.o.b. **mill**, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfg's. Bright
EAST	Bethlehem, Pa.				4.875 *B3*	6.325 *B3*	6.225 *B3*					
	Buffalo, N. Y.	4.15 *B3* 4.18 *R3*	4.15 *B3,R3*	5.25 *B5*	4.875 *B3,R3*	6.325 *B3,B5*	6.225 *B3*	4.10 *B3*			6.25 *B3*	5.525 *W6*
	Claymont, Del.							4.10 *C4*		5.55 *C4*		
	Coatesville, Pa.							4.10 *L4*		5.55 *L4*		
	Conshohocken, Pa.							4.10 *A2*	5.15 *A2*		6.25 *A2*	
	Harrisburg, Pa.							4.10 *C3*	5.15 *C3*			
	Hartford, Conn.			5.75 *R3*		6.775 *R3*						
	Johnstown, Pa.	4.15 *B3*	4.15 *B3*		4.875 *B3*		6.225 *B3*	4.10 *B3*		5.55 *B3*	6.25 *B3*	5.525 *B3*
	Morrisville, Pa.	4.30 *U1*	4.30 *U1*		5.025 *U1*							
	Newark, N. J.			5.65 *W10*		6.65 *W10*						
	New Haven, Conn.											
	Camden, N. J.			5.65 *P10*		6.50 *P10*						
	Putnam, Conn.			5.75 *W10*								
	Sparrows Pt., Md.		4.15 *B3*					4.10 *B3*		5.55 *B3*	6.25 *B3*	5.625 *B3*
	Palmer, Worcester, Mansfield, Mass.			5.75 *B5* 6.10 *W11*		6.775 *B5*						5.825 *A5, W6*
	Readville, Mass.			5.75 *C14*								
MIDDLE WEST	Alton, Ill.	4.35 *L1*										5.70 *L1*
	Ashland, Ky.							4.10 *A7*				
	Canton-Massillon, Ohio			5.20 *R2,R3*	4.875 *R3,T5*	6.325 *R2,R3, T5*						
	Chicago, Joliet, Ill.	4.15 *U1, N4,W8* 4.22 *R3*	4.15 *R3,N4*	5.20 *A5,W10, W8,B5,L2*	4.875 *U1, W8,R3*	6.325 *A5,W8, W10,L2, R3,B5*		4.10 *U1,W8*	5.15 *U1*	5.55 *U1*	6.25 *U1*	5.525 *A1, R3,N4,W1*
	Cleveland, Ohio	4.21 *R3*	4.15 *R3*	5.20 *A5,C13*		6.325 *A5, C13*		4.10 *J3,R3*	5.15 *J3*		6.25 *J3*	5.525 *A5, R3,C13*
	Detroit, Mich.	4.30 *R5* 4.35 *G3*		5.35 *R5,P8* 5.40 *B5* 5.45 *P3*	4.975 *R5* 5.075 *G3*	6.425 *R5* 6.475 *P8* 6.525 *B5,P3*	6.425 *G3*	4.30 *G3*			6.45 *G3*	
	Duluth, Minn.											5.525 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.15 *I3, U1, Y1*	4.15 *I3, U1, Y1*	5.20 *R3*	4.875 *I3, U1, Y1*	6.325 *R3,M5*	6.225 *U1,I3* 6.725 *Y1*	4.10 *I3, U1, Y1*	5.15 *I3*	5.55 *U1*	6.25 *U1,I3* 6.75 *Y1*	5.625 *M4*
	Granite City, Ill.							4.30 *G2*				
	Kokomo, Ind.											5.625 *C9*
	Sterling, Ill.	4.25 *N4*	4.25 *N4*									5.625 *N4*
	Niles, Ohio Sharon, Pa.							4.10 *S1*		5.55 *S1*	6.25 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.15 *J3, U1*	4.15 *J3, U1*	5.20 *A5, J3, W10,R3,C8*	4.875 *U1,C11*	6.325 *A5,C11, W10,C8*	6.225 *J3, U1*	4.10 *J3, U1*	5.15 *U1*	5.55 *U1*	6.25 *J3, U1*	5.525 *A5, J3,P6*
	Portsmouth, Ohio											5.525 *P1*
	Weirton, Wheeling, Follansbee, W. Va.	4.15 *W3*						4.10 *W3*				
	Youngstown, Ohio	4.15 *U1,Y1* 4.20 *R3*	4.15 *R3, U1, Y1*	5.20 *Y1,F2*	4.875 *U1,Y1, C10*	6.325 *Y1, C10,F2*	6.225 *U1* 6.725 *Y1*	4.10 *R3, U1, Y1*			6.75 *Y1*	5.525 *Y1*
WEST	Emeryville, Cal.	4.90 *J5*	4.90 *J5*									
	Fontana, Cal.	4.85 *K1*	4.85 *K1*		5.925 *K1*		7.475 *K1*	4.75 *K1*		6.60 *K1*	6.95 *K1*	
	Geneva, Utah							4.10 *C7*			6.25 *C7*	
	Kansas City, Mo.	4.75 *S2*	4.85 *S2*		5.475 *S2*		6.825 *S2*					6.125 *S2*
	Los Angeles, Torrance, Cal.	4.85 *B2,C7*	4.85 *B2,C7*	6.65 *R3*	5.925 *B2*		6.925 *B2*					6.475 *B2*
	Minnequa, Colo.	4.60 *C6*	4.75 *C6*					4.95 *C6*				5.775 *C6*
	Portland, Ore.	4.90 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	4.85 *C7,P9* 4.90 *B2*	4.85 *C7,P9* 4.90 *B2*				6.975 *B2*					6.475 *C7*
	Seattle, Wash.	4.90 *B2,N6*	4.90 *B2,S11*				6.975 *B2*	5.00 *B2*			7.15 *B2*	
SOUTH	Atlanta, Ga.	4.35 *A8*	4.35 *A8*									5.725 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.15 *T2,C16* 4.18 *R3*	4.15 *R3,T2, C16*				6.225 *T2*	4.10 *R3,T2*			6.25 *T2*	5.525 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.55 *S2*	4.55 *S2*		5.275 *S2*			4.50 *L3, S2*				5.925 *S2*

Steel Prices

(Effective Mar. 30, 1954)

Key to Steel Producers

With Principal Offices

A1 Acme Stee Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa
S9 Superior Steel Corp., Carnegie, Pa.
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass
T7 Texas Steel Co., Fort Worth

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa
U3 Fred Ulbrich & Sons, Wallingford, Conn.

W1 Wallingford Steel Co., Wallingford, Conn
W2 Washington Steel Corp., Washington, Pa
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.

Y1 Youngstown Sheet & Tube Co., Youngstown

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal
STANDARD T. & C.																						
Sparrows Pt. *B3*	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0								
Youngstown *R3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Fontana *K1*	13.25	+2.0	16.25	1.0	18.75	4.5	21.25	5.5	21.75	6.5	22.25	7.0	23.75	7.0								
Pittsburgh *J3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Alton, Ill. *L1*	24.25	8.0	27.25	12.0	29.75	15.5	32.25	16.5	32.75	17.5	33.25	18.0	34.75	18.0								
Sharon *M3*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Morrisville *N2*	24.25		27.25		29.75		32.25		32.75		33.25		34.75									
Pittsburgh *N1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Wheeling *W5*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Wheatland *W4*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0								
Youngstown *Y1*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
Indiana Harbor *Y1*	25.25	9.0	28.25	13.0	30.75	16.5	33.25	17.5	33.75	18.5	34.25	19.0	35.75	19.0								
Lorain *N2*	26.25	10.0	29.25	14.0	31.75	17.5	34.25	18.5	34.75	19.5	35.25	20.0	36.75	20.0	15.75	0.0	19.75	2.5	22.25	5.0	23.75	6.5
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0								
Youngstown *R3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Fontana *K1*	16.75		20.75		22.75		23.25		23.75		24.25		24.75									
Pittsburgh *J3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Alton, Ill. *L1*	27.75	13.0	31.75	17.0	33.75	20.5	34.25	19.5	34.75	20.5	35.25	21.0	35.75	20.0								
Sharon *M3*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Pittsburgh *N1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Wheeling *W5*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Wheatland *W4*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0								
Youngstown *Y1*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75
Indiana Harbor *Y1*	28.75	14.0	32.75	18.0	34.75	21.5	35.25	20.5	35.75	21.5	36.25	22.0	36.75	21.0								
Lorain *N2*	29.75	15.0	33.75	19.0	35.75	22.5	36.25	21.5	36.75	22.5	37.25	23.0	37.75	22.0	16.25	0.75	20.75	3.75	23.75	6.75	28.75	9.75

Galvanized discounts based on zinc, at 11¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ⅛ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.; 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢. Threads only buttweld and seamless, 2¼ pts. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 4½ pts. higher discount. Buttweld jobbers' discount, 5 pct. East St. Louis zinc price now 9.75¢.

Steel Prices

(Effective Mar. 30, 1954)

To identify producers, see Key on preceding page

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *Ul*	4.325	5.20	5.275	....	....	....	....
Chicago *R3*	....	....	....	7.05	....	....	....
Cleveland *R3*	....	....	....	....	....	....	....
Ensley *T2*	4.325	5.20	....	....	....	....	....
Fairfield *T2*	....	5.20	....	7.05	....	5.125	....
Gary *Ul*	4.325	5.20	....	....	....	5.125	....
Ind. Harbor *I3*	4.325	....	5.275	7.05	....	5.125	....
Johnstown *B3*	....	5.20	....	....	....	....	....
Joliet *Ul*	....	5.20	5.275	....	....	....	....
Kansas City *S2*	....	....	....	7.30	....	....	11.00
Lackawanna *B3*	4.325	5.20	5.275	....	....	5.125	....
Lebanon *B3*	....	....	....	7.05	10.50	....	11.00
Minnequa *C6*	4.325	5.70	5.275	7.05	....	5.125	11.00
Pittsburgh *Ol*	....	....	....	....	10.50	....	11.00
Pittsburgh *P5*	....	....	....	....	10.50	....	11.00
Pittsburgh *J3*	....	....	....	7.05	....	....	....
Pitt'g, Cal. *C7*	....	....	....	....	....	5.275	....
Seattle *B7*	....	....	....	7.55	....	5.275	11.50
Steelton *B3*	4.325	....	5.275	....	....	5.125	....
Struthers *Yl*	....	....	....	....	....	....	....
Torrance *C7*	....	....	....	....	....	5.275	....
Youngstown *R3*	....	....	....	7.05	....	....	....

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*	....	8.75	9.75	10.65	11.60	12.15	12.65
Brackenridge *A5*	....	8.75	9.75	10.65	11.60	....	12.65
Granite City *G2*	8.60	9.20	10.20	....	....	....	....
Ind. Harbor *I3*	8.15	8.75	9.75	....	....	....	....
Manfield *E2*	8.15	8.75	9.75	10.65	....	....	....
Newport, Ky. *N5*	8.15	8.75	9.75	10.65	11.60	....	....
Niles, O. *N3*	8.15	8.75	9.75	....	....	....	....
Vandergrift *Ul*	8.15	8.75	9.75	10.65	11.60	12.15	12.65
Warren, O. *R3*	8.15	8.75	9.75	....	....	....	....
Zanesville *A7*	8.15	8.75	9.75	10.65	11.60	12.15	12.65

CLAD STEEL

	Plate	Sheet
Stainless-carbon		
No. 304, 20 pct.		
Coatesville, Pa., *L4*	*32.7	
Washington, Pa., *J2*	....	
Claymont, Del., *C4*	....	
New Castle, Ind., *I2*	....	32.50
Nickel-carbon		
10 pct. Coatesville, Pa., *L4*	37.5	
Inconel-carbon		
10 pct. Coatesville, Pa., *L4*	46.10	
Monel-carbon		
10 pct. Coatesville, Pa., *L4*	38.90	

* Includes annealing and pickling, sandblasting.

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9–15½ ga.	"T" Fence Posts	Single Loop Bale Ties	Twisted Barbless Wire	Galv. Barbed Wire	Merch. Wire Annld	Merch. Wire* Galv.
	Col	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	131	140	....	149	....	153	6.675	7.075
Aliquippa, Pa. *J3*	131	143	....	....	....	150	6.675	7.20
Atlanta *A8*	133	145	....	151	....	158	6.775	7.30
Bartonville *K2*	133	144	....	....	....	157	6.775	7.275
Buffalo *W6*	....	....	....	....	....	....	....	....
Chicago, Ill. *N4*	131	142	....	149	155	155	6.675	7.175
Cleveland *A6*	137	....	....	....	....	....	....	....
Cleveland *A5*	....	....	....	....	....	....	6.675	....
Crawfrdsvl. *M4*	133	145	....	151	....	153	6.775	7.325
Donora, Pa. *A5*	131	140	....	149	....	153	6.675	7.075
Duluth *A5*	131	140	145	149	....	153	6.675	7.075
Fairfield, Ala. *T2*	131	140	....	149	....	153	6.675	7.075
Galveston *D4*	139	148	....	....	....	....	....	....
Houston *S2*	139	148	....	....	....	161	7.075	7.475
Johnstn., Pa. *B3*	131	143	145	....	156	156	6.675	7.225
Joliet, Ill. *A5*	131	140	....	149	....	153	6.675	7.075
Kokomo, Ind. *C9*	133	142	....	151	....	155	6.775	7.175
Los Angeles *B2*	....	....	....	....	....	....	7.625	....
Kansas City *S2*	143	152	....	161	....	165	7.275	7.675
Minnequa *C6*	136	148	150	154	162	162	6.925	7.325
Monessen *P6*	131	145	....	....	....	157	6.675	7.225
Moline, Ill. *R3*	....	....	145	....	....	....	....	....
Pitt'sburg, Cal. *C7*	150	163	....	173	173	173	7.625	8.025
Portsmouth *P7*	....	....	....	....	....	....	6.675	....
Rankin, Pa. *A5*	131	140	....	....	....	153	6.675	7.075
So. Chicago *R3*	131	140	145	149	....	153	6.675	7.075
S. San Fran. *C6*	....	....	....	....	....	173	....	....
Sparrows Pt. *B3*	133	....	....	151	158	158	6.775	7.325
Struthers, O. *Yl*	....	....	....	....	....	....	6.675	7.175
Worcester *A5*	137	....	....	....	....	....	6.975	....
Williamsport, Pa. *S10*	133	....	158	....	....	....	....	....

Cut Nails, carloads, base $8.00 per keg (less 20¢ to jobbers), at Conshohocken, Pa. (*A2*).

* Alabama City and So. Chicago don't include zinc extra. Galvanized products computed with zinc at 11.0¢ per lb.

WAREHOUSES

Base price, f.o.b., dollars per 100 lb.

Cities	City Delivery Charge	Sheets: Hot-Rolled	Sheets: Cold-Rolled (15 gage)	Sheets: Galvanized (10 gage)	Strip: Hot-Rolled	Strip: Cold-Rolled	Plates	Shapes: Standard Structural	Bars: Hot-Rolled	Bars: Cold-Finished	Alloy Bars: Hot-Rolled A 4615 As rolled	Alloy Bars: Hot-Rolled A 4140 Annealed	Alloy Bars: Cold-Drawn A 4615 As rolled	Alloy Bars: Cold-Drawn A 4140 Annealed
Baltimore	$.20	6.20	7.64	7.78	7.00	.....	6.85	6.98	6.86	8.17	.....	.....	.....	.....
Birmingham	.15	6.15	7.00	8.00[4]	6.30	.....	6.35	6.35	6.15	8.75	.....	.....	.....	.....
Boston	.20	6.89	7.83	9.18	7.13	9.23–9.35[2]	7.13	7.06	6.87	8.35	.....	12.05	.....	14.50
Buffalo	.20	6.20–6.35	7.15–7.70	8.85–9.01	6.65–6.79	.....	6.65–6.68	6.55–6.59	6.35	7.70	.....	11.95	.....	14.25
Chicago	.20	6.18	7.12	8.15	6.42	.....	6.33–6.38	6.46	6.28	7.30	.....	11.75	.....	14.25
Cincinnati	.15	6.51	7.19	8.10	6.72	.....	6.80	6.93	6.58	7.66	.....	12.17	.....	14.87
Cleveland	.20	6.18	7.12	7.90	6.58	.....	6.56	6.79	6.34	7.40	.....	11.89	.....	14.39
Denver		7.95	8.85	10.47	8.20	9.55	7.95	7.95	8.05	9.05	.....	16.05	.....	15.75
Detroit	.20	6.35–6.45	7.29–7.31	8.42	6.69–7.71	7.36	6.86	6.91–6.93	6.56	7.60	12.47	11.92	14.42	13.44–14.62
Houston	.20	7.15	7.60–7.85	9.40	7.45	.....	7.20	7.35	7.45	9.30	.....	12.95	.....	.....
Kansas City	.20	6.85	7.79	8.67	7.09	.....	7.00–7.05	7.13	6.95	8.08	.....	12.42	.....	.....
Los Angeles	.20	7.25	9.00	9.70	7.55	10.75–11.30	7.20	7.35	7.15–7.25	9.10–9.75	13.20	13.05	15.75	15.85–16.05
Memphis	.10	6.79	7.69	.....	6.90	.....	7.01	7.09	6.88	7.89–8.31	.....	.....	.....	.....
Milwaukee	.20	6.35	7.12	8.00–8.32	6.59–6.60	8.07	6.50–6.55	6.61–6.63	6.45	7.57	.....	11.92	.....	14.42
New Orleans	.15	6.51	7.41	9.32	6.63	10.42	6.73	6.81–7.45	6.60	8.42–10.42	.....	.....	.....	.....
New York	.30	6.78	7.75[5]–8.20	8.42–8.67[3]	7.16	9.05	6.99	6.90	7.06	8.43	12.29	12.14	14.54	14.64
Norfolk	.20	6.90	.....	.....	7.20	.....	7.15	7.20	7.20	8.56	.....	.....	.....	.....
Philadelphia	.25	6.60	7.38	8.15	7.02	.....	6.63	6.67	6.87	8.24	12.04	11.89	14.29	14.39
Pittsburgh	.20	6.18	7.12	8.00	6.55	.....	6.33	6.46	6.28	7.65	.....	11.75	.....	14.25
Portland	.10	7.90	8.45	9.15	7.65	.....	7.30	7.25	7.35	10.65	.....	.....	.....	.....
Salt Lake City	.20	9.05	10.80	10.65	9.35	11.25	8.70	8.85	9.10–9.20	11.25	.....	.....	.....	.....
San Francisco	.20	7.35	8.70	9.50–10.15	7.60	10.35	7.20	7.25	7.15	9.75–9.85	13.20	12.80–13.05	15.50	15.55–16.05
Seattle	.20	8.15	9.50	9.80	8.00	.....	7.60	7.50	7.60	10.65	.....	13.40	.....	16.00
St. Louis	.20	6.48	7.42	8.45	6.72	8.47	6.73	6.86	6.58	7.50–7.70	12.20	12.05	12.20	14.55
St. Paul	.15	6.84	7.78	8.66	7.08	.....	6.99	7.12	6.94	8.06	.....	12.42	.....	.....

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over. Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb. (2)20,000 lb or over. (3)450 to 1499 lb. (4)500 to 9999 lb. (5)1000 lb or over. (6)400 to 1499 lb.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bridgeport, Conn. *S7*	5.75	7.65	8.60	10.55	12.85
Carnegie, Pa. *S9*	.....	7.65	8.60	10.55	12.85
Cleveland *A5*	5.45	7.65	8.60	10.55	12.85
Detroit *D1*	5.65	7.85	8.80	10.55	.....
Detroit *D2*	5.65	7.85	8.80	.....	.....
Harrison, N. J. *C11*	.....	.....	8.90	10.85	13.15
Indianapolis *C5*	5.60	7.80	8.60	10.55	.....
New Castle, Pa. *B4*	5.80	8.00	8.60	.....	.....
New Haven, Conn. *D1*	5.90	7.95	8.90	10.85	.....
Riverdale, Ill. *A1*	5.70	7.80	8.75	10.70	13.00
Sharon, Pa. *S1*	5.45	7.65	8.60	10.55	12.85
Trenton *R4*	.....	7.95	8.90	10.85	13.15
Wallingford *W1*	6.20	7.95	8.90	10.85	13.15
Warren, Ohio *T4*	5.45	7.65	8.60	10.55	12.85
Weirton, W. Va. *W3*	5.45	7.65	8.60	10.55	12.85
Worcester, Mass. *A5*	6.30	7.95	8.90	10.85	13.15
Youngstown *C5*	5.45	7.65	8.60	10.55	.....

* Sold on Pittsburgh base.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	27.34	32.98	26.51	31.98
	2½	12	36.82	44.41	35.70	43.07
	3	12	42.52	51.28	41.23	49.73
	3½	11	49.63	59.87	48.13	58.04
	4	10	65.91	79.50	63.92	77.10
National/Tube	2	13	.....	32.98	26.51	.....
	2½	12	36.82	44.41	35.70	.....
	3	12	42.52	51.28	41.23	.....
	3½	11	49.63	59.87	48.13	.....
	4	10	65.91	79.50	63.92	.....
Pittsburgh Steel	2	13	27.34	32.98	.....	.....
	2½	12	36.82	44.41	.....	.....
	3	12	42.52	51.28	.....	.....
	3½	11	49.63	59.87	.....	.....
	4	10	65.91	79.50	.....	.....

—Miscellaneous Prices—

(Effective Mar. 30, 1954)

TOOL STEEL

F.o.b. Mill

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.48
18	4	1	—	5	2.16
18	4	2	—	—	1.64
1.5	4	1.5	8	—	.895
6	4	2	6	—	1.005

High-carbon chromium	.70
Oil hardened manganese	.39
Special carbon	.355
Extra carbon	.30
Regular carbon	.25

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$111.80 to $115.30
6 to 24-in., del'd N. Y.	115.00 to 116.00
6 to 24-in., Birmingham	98.00 to 102.50
6-in. and larger f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$129.50 to $131.50

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 1, 1953, to end of 1954 season.

	Gross Ton
Openhearth lump	$11.15
Old range, bessemer	10.30
Old range, nonbessemer	10.15
Mesabi, bessemer	10.05
Mesabi, nonbessemer	9.90
High phosphorus	9.90

Prices based on upper Lakes rail freight rates, Lake vessel freight rates, handling and unloading charges, and taxes thereon, in effect on June 24, 1953. Increases or decreases after such date are for buyer's account.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven) Connellsville, Pa.	$14.25 to $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$16.50 to $17.00
Foundry, oven coke	
Buffalo, del'd	$28.08
Chicago, f.o.b.	24.50
Detroit, f.o.b.	25.50
New England, del'd	26.05
Seaboard, N. J., f.o.b.	24.00
Philadelphia, f.o.b.	23.95
Swedeland, Pa., f.o.b.	23.85
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	25.00
Cleveland, del'd	27.43
Cincinnati, del'd	26.56
St. Paul, f.o.b.	23.75
St. Louis, f.o.b.	26.00
Birmingham, f.o.b.	22.65
Lone Star, Tex., f.o.b.	18.50

ELECTRODES

Cents per lb, f.o.b. plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in In.	Cents Per lb.
	GRAPHITE	
24	84	20.50
20	72	20.00
12, 14, 18	72	20.50
7 to 10	60	21.00
6	60	23.25
4	40	26.00
3	40	27.25
2½	30	28.00
2	24	43.50
	CARBON	
40	100, 110	8.95
35	110	8.95
30	110	8.95
24	72 to 84	9.10
20	90	8.95
17	72	9.10
14	72	9.50
10, 12	60	10.30
8	60	10.55

Versatility

. . . Over 100 presses are available at WSM for producing light, heavy and deep drawn stampings in all shapes and sizes. Blanking, draw, knuckle joint and toggle types are ready to turn out stamped component parts in such workable metals as carbon and stainless steel, monel, brass, bronze, copper and aluminum.

There's versatility too, in personnel at WSM . . . whether the problem be one of engineering or manufacture.

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Write today for folder describing WSM facilities — or, let us have our representative discuss your stamping problems . . . without obligation.

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SPECIALISTS IN SKILLED STAMPING SERVICE

ARMSTRONG *Carbide* TOOL HOLDERS

See us at Booth 232 ASTE Show Philadelphia

For Higher Speeds, and Heavier Feeds

ARMSTRONG Carbide Tool Holders and ARMIDE (Carbide Tipped) Cutters come in cased sets for tool rooms and maintenance departments, and individually in all sizes for general machine shop and production turning. They permit not only the ready machining of sand-filled castings, the hardest and toughest steels as well as many heretofore "unmachinable" materials, but also make practical much heavier cuts and cutting speeds up to 600 f.p.m. on ordinary work. They also run from 10 to 100 times as long between regrindings.

Write for Catalog

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

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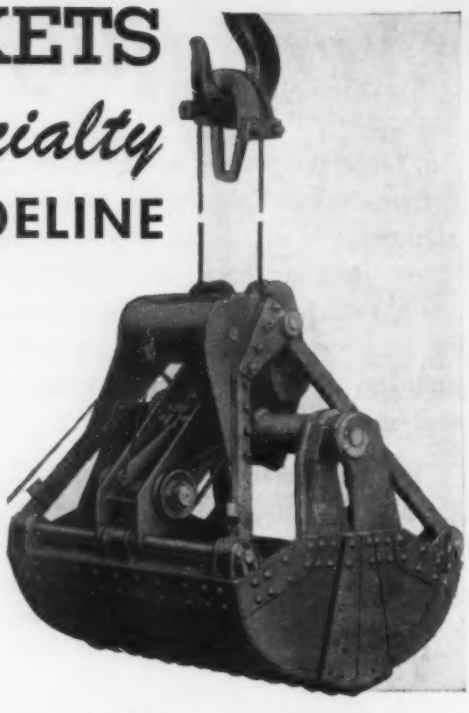
NEW YORK • SAN FRANCISCO

Erie BUCKETS ARE A *Specialty* — NOT A SIDELINE



Right from the start we thought enough about buckets to make them our specialty. That was 34 years ago. They're still our bread and butter.

Today, thousands of Erie units all over the world are turning in top performance. That's because they were built with a complete understanding of what they had to do.

Why not let our engineers review your set-up. There's no obligation. And, based on past experience, we're sure we can offer a helpful suggestion.

Write for BULLETIN 403, Dept. A44

FORMERLY ERIE STEEL CONSTRUCTION COMPANY

ERIE STRAYER CO.

SAME PEOPLE • SAME PRODUCTS • JUST A NEW NAME

544 GEIST ROAD • ERIE, PENNSYLVANIA

Everybody knows this sign stands for money ...and smart gear buyers know this sign CINTI stands for the best in custom gears.

CINTI "Gears... Good Gears Only"

THE CINCINNATI GEAR CO. • CINCINNATI 27, OHIO

—Miscellaneous Prices—

(Effective Mar. 30, 1954)

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

	Pct Off List Less Keg	K. Reg.	Less Keg	K. Hvy.
½ in & smaller	+2	15	+2	18
9/16 in. & ⅝ in.	+7	11	+32*	+10*
¾ in. to 1½ in. inclusive	+8	10	+27**	+6**
1⅝ in. & larger	+9	9	+27	+6

* 9/16 to ¾ in.
** ⅞ to 1½ in.

Nuts, Hot Pressed—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & ⅝ in.	2	18	+20	net
¾ in. to 1½ in. inclusive	+6	12	+25	+4
1⅝ in. & larger	+8	10	+25	+4

Nuts, Cold Punched—Hexagon

½ in. & smaller	11	26	8	23
9/16 in. & ⅝ in.	9	24	+2	15
¾ in. to 1½ in. inclusive	+1	16	+9	9
1⅝ in. & larger	+16	3	+20	net

Nuts, Semi-Finished—Hexagon

½ in. & smaller	23	36	14	28
9/16 in. & ⅝ in.	18	32	4	20
¾ in. to 1½ in. inclusive	8	23	+8	10
1⅝ in. & larger	+14	5	+20	net
	Light			
7/16 in. & smaller	33	43		
½ in. thru ⅝ in.	26	37		
¾ in. to 1½ in. inclusive	18	30		

Stove Bolts — *Pct Off List*

Packaged, steel, plain finished	44½—10
Packaged, plain finish	25½—10
Bulk, plain finish**	59*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

	Base per 100 lb
½ in. & larger	$8.90
	Pct Off List
7/16 in. and smaller	30

Cap and Set Screws

(In bulk)	*Pct Off List*
Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	40
¾ in. thru 1 in up to & including 6 in.	36
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	43
⅞ in. thru 1 in up to & including 6 in.	33
Milled studs	17
Flat head cap screws, listed sizes	12
Fillister head cap, listed sizes	7
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	37

Machine and Carriage Bolts

	Pct Off List Less Case	C.
½ in. & smaller x 6 in. & shorter	4	20
9/16 in. & ⅝ in. x 6 in. & shorter	5	21
¾ in. & larger x 6 in. & shorter	3	19
All diam. longer than 6 in.	+4	13
Lag, all diam. x 6 in. & shorter	12	27
Lag, all diam. longer than 6 in.	8	23
Plow bolts	30	..

Miscellaneous Prices

(Effective Mar. 30, 1954)

REFRACTORIES

Fire Clay Brick	*Carloads per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$109.00
No. 1 Ohio	102.00
Sec. quality, Pa., Md., Ky., Mo., Ill.	102.00
No. 2 Ohio	93.00
Ground fire clay, net ton, bulk (except Salina, Pa. add $1.50)	16.00

Silica Brick	
Mt. Union, Pa., Ensley, Ala.	$115.00
Childs, Hays, Pa.	120.00
Chicago District	125.00
Western Utah	131.00
California	138.00
Super Duty Hays, Pa., Athens, Tex., Windham	132.00
Curtner, Calif.	150.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	19.00
Silica cement, net ton, bulk, Hays, Pa.	21.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	20.00
Silica cement, net ton, bulk, Utah and Calif.	28.50

Chrome Brick	*Per net ton*
Standard chemically bonded Balt.	$86.00
Standard chemically bonded, Curtner, Calif.	96.25
Burned, Balt.	80.00

Magnesite Brick	
Standard Baltimore	$109.00
Chemically bonded, Baltimore	97.50

Grain Magnesite	*St. ¾-in. grains*
Domestic, f.o.b. Baltimore in bulk fines removed	$64.40
Domestic, f.o.b. Chewalah, Wash., Luning, Nev. in bulk	38.00
in sacks	43.75

Dead Burned Dolomite	*Per net ton*
F.o.b., bulk, producing points in: Pa., W. Va., Ohio	$14.50
Midwest	14.60
Missouri Valley	13.65

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill.
Price, net ton; Effective CaF_2 content

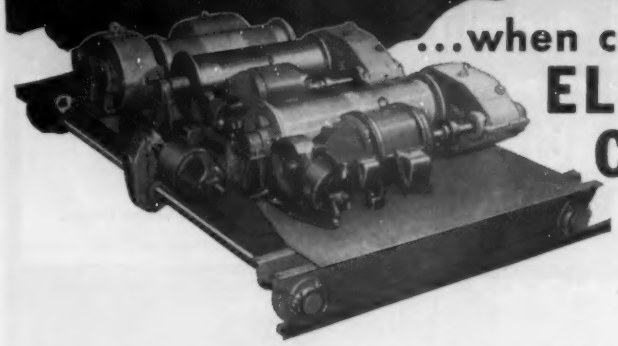
72½%	$44.00
70% or more	42.50
60% or less	38.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron, c.i.f. New York, ocean bags	11.25¢
Canadian sponge iron, del'd. in East	12.0¢
Domestic sponge iron, 98+% Fe, carload lots	13.0¢
Electrolytic iron, annealed, 99.5+% Fe	44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe	60.0¢
Hydrogen reduced iron minus 300 mesh, 98+% Fe	63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe	83.0¢ to $1.48
Aluminum	31.5¢
Brass, 10 ton lots	29.50¢ to 36.50¢
Copper, electrolytic	43.50¢
Copper, reduced	43.50¢
Cadmium, 100-199 lb 95¢ plus metal value	
Chromium, electrolytic, 99% min., and quality, del'd	$3.60
Lead	21.00¢
Manganese	57.0¢
Molybdenum, 99%	$2.75
Nickel, unannealed	89.50¢
Nickel, annealed	96.50¢
Nickel, spherical, unannealed	93.50¢
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	91.0¢
Stainless steel, 316	$1.10
Tin	14.04¢ plus metal value
Tungsten, 99% (65 mesh)	$5.35
Zinc, 10 ton lots	17.5¢ to 25.0¢

Scrutinize Trolley Details



...when considering
ELECTRIC CRANES

WITH the exception of bridge movement all crane functions are dependent upon the trolley.

Hence the importance of carefully investigating this vital unit.

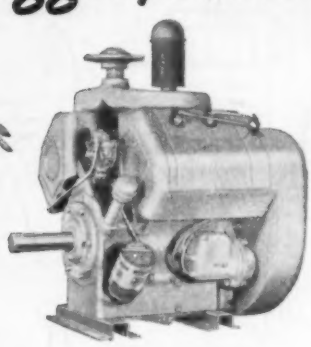
Here is a Euclid trolley that will withstand the most critical examination from wheels through welded base and into the most minute details of all components.

It is 22 feet long and equipped with hoists of two capacities and controls to handle magnet and scrap grapple.

Similar expert attention to details is given to EUCLID Crane trolleys of all capacities. We invite your searching investigation.

The EUCLID CRANE & HOIST Co.
1361 CHARDON ROAD
EUCLID, OHIO

a Bigger, Better WISCONSIN
HEAVY-DUTY Air-Cooled
ENGINE
4-Cylinder, V-Type
Model VG4D
25 to 36 Horsepower



MORE Power TO FIT THE MACHINE

MORE Power TO FIT THE JOB

One of the outstanding performance characteristics of this fine engine is its exceptionally smooth running. Among other things, this is accomplished by means of accurately balanced weights, forged to the cheeks of the crankshaft, counter-balancing reciprocating forces in the connecting rods and pistons.

This engine is regularly furnished with Stellite exhaust valves and valve seat inserts, with positive type valve rotators — highly desirable for prolonging the life of valves and greatly reducing the frequency of valve servicing. Rotators cause a slow rotation of valve during time it is lifted off its seat by the camshaft, providing new positioning every time the valve seats, assuring uniform wear and retarding lead or carbon build-up.

For equipment requiring 25 to 36 hp., specify the Wisconsin Heavy-Duty AIR-COOLED Model VG4D. Detailed engineering data gladly supplied.

WISCONSIN MOTOR CORPORATION
World's Largest Builders of Heavy-Duty Air-Cooled Engines
MILWAUKEE 46, WISCONSIN

the multi-purpose lifting machine for the small shop

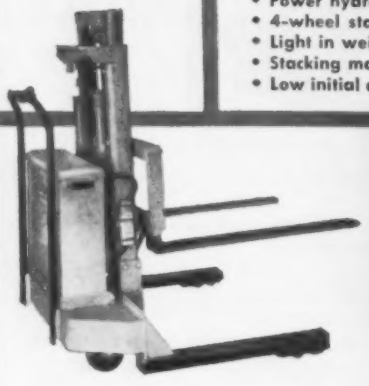
STUEBING DESIGNED • STUEBING ENGINEERED • STUEBING BUILT

LIFT TRUCKS INC. WWW STUEBING CINCINNATI

Hydrolift Straddle Stacker

here are the FEATURES you want most in a mobile stacker

- Capacities to 2000 lbs.
- Power hydraulic telescopic lift.
- 4-wheel stability.
- Light in weight and highly maneuverable.
- Stacking made easy inside railroad cars or motor trucks.
- Low initial cost and upkeep.



The Hydrolift
fulfills the demand for an all-purpose hand truck in the average plant. It can be used for handling pallets, skids, dies, drums, barrels, sacked goods, and for numerous other non-routine jobs.

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TOOL COLUMBIA STEELS

—Ferroalloy Prices—

(Effective Mar. 30, 1954)

Ferrochrome

Contract prices, cents per lb contained Cr, lump size, bulk, in carloads, delivered.

65-72 Cr, 2% max. Si.

0.025% C	34.50	0.20% C	33.50
0.06% C	34.50	0.50% C	33.25
0.10% C	34.00	1.00% C	33.00
0.15% C	33.75	2.00% C	32.75

65-69% Cr, 4.9% C 34.75
62-66% Cr, 4.6% C, 6-9% Si 35.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60.65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	25.85
Ton lots	28.00
Less ton lots	29.50

High-Nitrogen Ferrochrome

Low-carbon type 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 3¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.18
0.50% max. C	1.14
9 to 11% C	1.11

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed, lump 4-in. x down, bulk 2-in. x down, 24.75¢ per lb of contained Cr plus 10.80¢ per lb of contained Si.

Bulk 1-in. x down, 24.90¢ per lb contained Cr plus 12.69¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, lump delivered.

30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	22.30
Less ton lots	23.30

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	17.50
Ton lots to carload packed	18.50
Less ton lots	20.00

Ferromanganese

Maximum contract base price, f.o.b. lump size, base content 74 to 75 pct Mn:

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland Ore.	10.00
Clairton, Pa.	10.00
Sheridan, Pa.	10.00

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.

Briquets, delivered, 66 pct Mn:

Carloads, bulk	12.50
Ton lots, packed	14.05

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Ferroalloy Prices

(Effective Mar. 30, 1954)

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$84.00
19 to 21%	3% max.	86.00
21 to 23%	3% max.	88.50
23 to 25%	3% max.	91.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
250 to 1999 lb	34.00
Less than 250 lb	37.00
Premium for hydrogen-removed metal	1.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn ..... 21.35¢

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	30.00	31.85	33.05
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢.

Carload bulk	11.00
Ton lots	12.65
Briquet contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $92.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $89.50. Add $1.00 per ton for each additional 0.50% Si up to and including 17%. Add $1.45 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton Lots	Carloads
96% Si, 2% Fe	20.10	18.00
97% Si, 1% Fe	20.60	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.30
Ton lots	7.90

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, delivered.

25% Si	20.00	75% Si	13.80
50% Si	10.80	85% Si	15.55
65% Si	12.20	90.95% Si	17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract, basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

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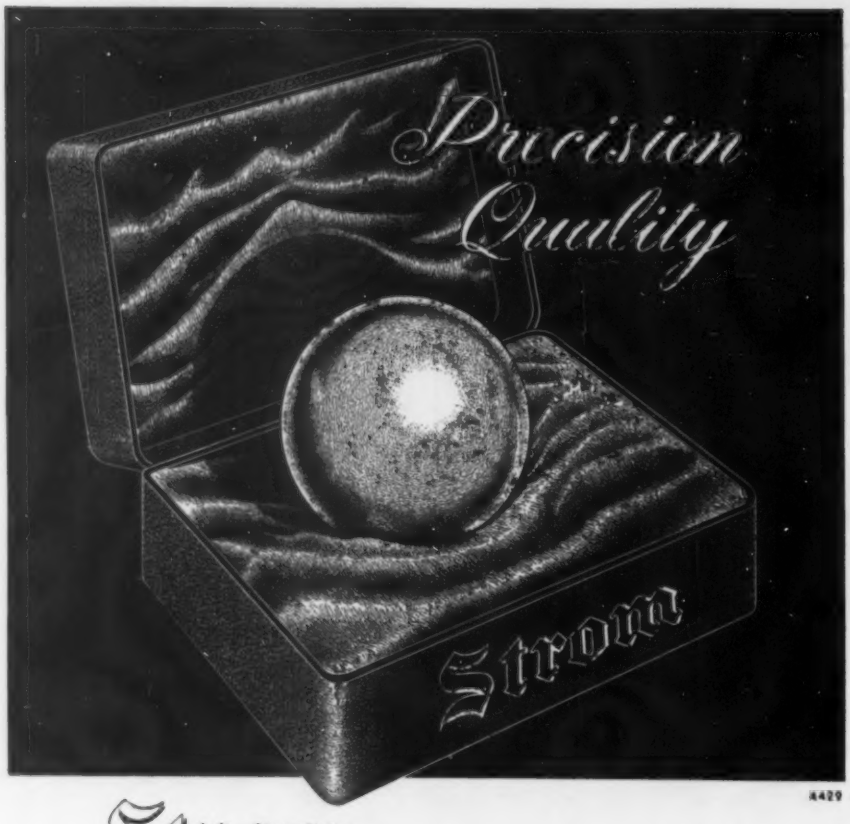

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Ferroalloy Prices

(Effective Mar. 30, 1954)

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis f.o.b. Suspension Bridge, N. Y.
- Carloads 9.90
- Ton lots 11.30

Calcium molybdate, 46.3-46.6% f.o.b Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.
- Ton lots $9.50
- Less ton lots 9.55

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30% C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $4.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo $1.32

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton $90.00
10 tons to less carload $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagra Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti..... $1.35

Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton $177.80

Ferrotungsten, ¼ x down, packed, per pound contained W. ton lots, f.o.b. $3.80

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound
- Carload, bulk lump ..... 14.50¢
- Ton lots, bulk lump ..... 15.75¢
- Less ton lots, lump ..... 16.25¢

Vanadium Pentoxide, 86 - 89% V_2O_5 contract basis, per pound Contained V_2O_5 ..... $1.35

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
- Ton lots ..... 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
- Carload, bulk ..... 8.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B... $5.35

Bortam, f.o.b. Niagara Falls
- Ton lots, per pound ..... 45¢
- Less ton lots, per pound ... 50¢

Corbortam, Ti 15-21%, B, 1-2%, Si, 3-4%, Al, 1-2%, C, 4-5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed.
- Ton lots per pound ..... 10.00¢

Ferroboron, 17.50% min. B, 1.00% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, Ton lots ... $1.30
F.o.b. Wash., Pa.; 100 lb up
- 10 to 14% B ..... .85
- 14 to 16% B 1.20
- 19% min. B 1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over
- No. 1 ..... $1.00
- No. 6 ..... 65¢
- No. 79 ..... 50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
- Ton lots $1.40
- Less ton lots 1.57

Nickel - Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% Max C, 3.00% max. Fe, balance Ni, delivered
- Less ton lots $2.05

Silcaz, contract basis, delivered
- Ton lots ..... 45.00¢